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THE RHOPALOCERA OF JAVA

ERYCINIDAE, LYCAENIDAE

BY

M. C. PIEPERS AND P. C. T. SNELLEN

WITH THE COLLABORATION OF H. FRUHSTORFER

WITH 9 PLATES CONTAINING 232 COLOURED FIGURES

THE HAGUE
MARTINUS NIJHOFF
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INTRODUCTION.

In the three former parts of this work the systematic treatment of the groups of Javanese Rhopalocera, there dealt with, having in each case been preceded by an Introduction, the same procedure is adopted in the present instance. On each occasion I there formulated the general deductions in the domain of biology which result in my opinion, from a study of the insect forms dealt with. Deductions, which,—although manifesting themselves much more readely in certain groups than in others and, therefore, more easily formulated when dealing with the groups in question—frequently do not apply exclusively to such groups, their significance extending much further over the entire domain of biology and may thus be of general value for the study of animal life and evolution, whose true nature is still really so little understood, possibly even as regards the spiritual life of man. Seeing that lepidopterists, like all zoologists, are for the greater part engaged in systematic or anatomical study, they mostly fail to grasp this significance and, consequently, the importance of such investigation on more philosophic lines. To me, however, this constitutes the most important part of my work. Descriptions of hitherto unknown forms, however useful, I regard as work of a lower order; even observations in connection with the habits and mode of life of animals have not, in my opinion, the same value as the study of the reason and of the general significance of phenomena of life. For this reason such etiological research constitutes the real aim of my work. All facts are simply intended to serve as a basis for this. But these must be as incontrovertible as is possible and for that reason require very accurate observation; the treatment in group fashion, restricted to a single, definitely segregated district of moderate dimensions, and offering different climatic conditions, as is the case with the island of Java, appeared to me particularly adapted for this purpose.

The extensive groep of Lycaenidae, particularly of great importance from this point of view, is now dealt with by me in this, the fourth part of my

work. To this I have to add the Erycinidae. This group, so richly represented in America, is closely related to the Lycaenidae and is indeed united with it by some systematists. It is, however, represented in Java by only a small number of species which, moreover, only occur in the mountains and, with a single exception, are very rare. Although repeated excursions to the mountains have been made by me, I have never resided there and only for a short time at Buitenzorg, situate at the foot of the mountain range. In consequence I have been unable to make a great number of observations, especially concerning their ontogenisis, in connection with these butterflies, most rare even there. I am, therefore, unable to venture on any explanation of the fact that of this family, so numerous in America, the Austro-Malayan fauna possesses but a few species. An adequate knowledge of the American forms would in fact be indispensable for this; for only by such means can an analogous phenomenon in connection with some ancient Malayan DANAIS forms be accounted for. Such knowledge, unfortunately, I do not possess. The Libytheidae, which SNELLEN regards as a separate family, are not here included in the Erycinidae. They are indeed but little related to the latter, not only as regards the difference in form of the genitalia, referred to by FRUHSTORFER, but also with respect to the antennae and to their early stages.

On the other shand the Lycaenidae are richly represented in Java, 169 species being known to me with sufficient certainty. I have indeed come across several other species, in collections for instance, stated to occur in Java, but whenever I entertained doubts as to the authenticity of the data I have omitted them. No great accuracy with regard to such data was formerly observed, and frequently "Java" was simply a general term for the whole Austro-Malayan Archipelago, while many specimens which have reached Europe from Java had been captured in other islands. The data supplied by dealers in insects, likewise, are frequently unreliable. The collections made in Java, or received from there by FRUHSTORFER and myself, on the other hand form a fair and safe basis to go upon. The Leiden Museum, moreover, possesses many specimens from Java with the name of the collector, known to have collected in Java, attached.

As regards systematic division I have in this instance again made use of the documents left by SNELLEN, at least as regards the general classification. Since the aim of my work is totally different from a lepidopterist's system I need not refer to the grounds on which SNELLEN based his systematic classification, nor to the keys he elaborated for it. Indeed, I do not attach much value to this. Every systematist proposes, at least to some extent, new classifications and frequently the one is as imperfect as the other. It will, therefore,

be easily understood, when reading my interpretation of the so-called tails and lobes of the wings of butterflies, that I am unable to agree when SNELLEN also adopts the view of the attributing even generic value to these. Nor, of course do I attach any weight to the same in reference to colour or the blending of colours. On the other hand I agree with him, and principally for the same reason, when he refuses to acknowledge several of the genera into which at present the old genus LYCAENA is frequently divided. SNELLEN took objection to this because, in his opinion, the characteristics indicated are not permanent whereby many species become very doubtful.

Now, while in a systematic treatment of the Lycaenidae in general it may be necessary to split up large genera into several smaller ones, the case is different where only the fauna of a single island is dealt with and the admission of a large number of genera is apt rather to create confusion than to afford facilities for identification. Since, however, under each species the literature is indicated as fully as circumstances permit, anyone can at a glance see to which genera any given species has been referred by the various authors. Considerable differences will be noticed in this respect. I have, however, found it necessary in some instances to depart from SNELLEN's classification. By mounting many of my duplicates my series, even of the species known to SNELLEN, have increased to such an extent, that in respect to these some of his views did not appear to me sufficiently warranted and I have therefore been unable to adopt these. Thus on the one hand I have had to reject a few new species described by him, while on the other hand my material has yielded additional species and on consulting the FRUHSTORFER collection I have become acquainted with several forms known neither to SNELLEN nor to me, or at least not from Java. A study of the writings on the Austro-Malayan Lycaenidae recently published by this lepidopterist has also proved of great use to me.

Descriptions, especially of such small butterflies as most of the Lycaenidae are, appear to me of little use. Another drawback is that the indication of the shades of colour, of great importance in the case of not a few Lycaenidae, is very uncertain with different observers; moreover, individual deviations are generally too little taken into account. For this reason I have as a rule given little notice to this, but have rather made special efforts to render my illustrations as accurate as possible. The small, but very important, differences between individuals of the same species on different islands especially are much more easily demonstrated and grasped bij means of good illustrations. Only in respect of the larvae and pupae a somewhat detailed description is, in addition, mostly indispensable. In those cases where SNELLEN has described new species

I have, however, found it expedient to reproduce his description; having hitherto been published in Dutch only they are inaccessible to many.

As I have already stated in my former introductions, I am an uncompromising opponent of what an English author has recently termed "the modern fashion of excessive splitting". My collaborator FRUHSTORFER, who has been strongly attacked by the subspecies mania, has produced a crowd of subspecific names in the Lycaenidae and owing to the importance of his distinctions in this respect I have thought it expedient invariably to record these names. But in spite of this I fail to see their utility. Would it not suffice to record these small differences? Not infrequently the subspecific name alone is indicated without mention of the specific name and thus confusion arises. Moreover not a few of these subspecies are certainly untenable, being in fact based simply on individual differences, which, owing to insufficient material or the influence of—at least with regard to Java insects—inaccurate ideas concerning so-called seasonal variation, have erroneously been looked upon as fixed races.

In general the Lycaenidae are characterized by a diminutive body. A single species, LIPHYRA BRASSOLIS, Westw., towers like a solitary giant above its kinsmen, but while a few ARHOPALA, although smaller than that species, attain a moderate size, all the other members of this group are small, a few even very small. The solitary large species, just referred to, produces with regard to this group exactly the same impression as produced bij HESTIAS in respect of Danaidae, by ORNITHOPTERA as compared with PAPILIOS and even by SATURNIAS amongst Heterocera. The reason of this will be understood by a perusal of my study of the so-called tails—to be discussed presently when dealing with the Papilionidae—in my article "*Ueber die sogenannten Schwänze der Lepidopteren*" published in the *Deutsche Entomologische Zeitschrift Iris*, 1903, coupled with that of the evolution of the caterpillar. These large forms are simply remnants of an older condition in which the butterflies of these groups were in general much larger, which condition in by far the larger majority of species has, owing to an evolutionary process of diminution, receded to smaller dimensions. But this process has, in accordance with the fixed rule of all animal evolution, operated to an extremely unequal extent in the different species and even individuals, and has in this manner enabled a few species to retain their original size to this day, while in the case of the changed forms frequently sundry relics of their former size of wings have likewise been preserved in the shape of the so-called tails and various similar appendages.

Now, seeing that the so-called tails are somewhat numerous in Lycaenidae and occur in various stages of development, it is very probable that the small size of body in this group is due to the same process of diminution, LIPHYRA

Brassolis, Westw. being practically the only species which so far has escaped its influence, although a few other of the Lycaenidae also still attain a fair size, while Arhopala Hercules, Hew. even approaches the former in its dimensions. The said process has, however, advanced in this group to such an extent that it must have operated during a very long period, leading to the inference that the group must be a very ancient one among the Rhopalocera, a supposition which receives confirmation from the presence of the girdle thread in the pupae. The difference between individuals of the same species, moreover, is striking, especially in the case of those species which Snellen includes in the genus Lycaena. Not infrequently real dwarfs are met with; I possess several specimens of Lycaena Pavana, Felder, and one of Lycaena Celeno, Cram., which are no larger than the species usually included in the genus Zizera. Whence does this difference come? Insufficient nourishment of the larva, will be the answer of the experimentalist, for by this means very small examples are obtained experimentally. But I am unable to concur in this view. Invariably, during drought as well as in the rainy season—therefore when there can be no question of lack of nourishment for the larva—much difference in size is found to occur between individuals, even though this does not always result in such dwarfed examples as those referred to. Moreover, many specimens from the middle of the dry period are no smaller than those occurring in the middle of the rainy season. Every creature, to be sure, is the result of a number of evolutionary processes, each of which acts independently on each individual and the result of which, consequently, must vary amongst the individuals, also where size is concerned. But this cannot account for all the difference. Why then is there so much difference in size between different species? Why are so many butterflies from Celebes and the Moluccas so much larger than those of the same species in Java, and why should in the lapse of time the diminution in size of the body, referred to, have manifested itself, causing us to regard such forms as Liphyra Brassolis, Westw., as well as Hestias and Ornithoptera, as relicts from earlier periods, a process which clearly manifests itself in the descent of the Papilios from the so much larger Ornithoptera, as is unmistakably demonstrated by the ontogenesis of the larvae of Papilio? In this direction, there is still unlimited scope for investigation in which account will have to be taken of the large size of so many animal forms formerly living. Among the Protoneuroptera, from which the Lepidoptera are descended, such giant forms are also known to have occurred.

The so-called tails occur in many species, differing in number, length, and shape, and sometimes forming lobes. They are purely relics, appendages of no utility to the insect, and whose frequent destruction, entire or partial therefore

does not in any way affect its vital functions. This is one of the many points on which the doctrine of evolution has shed light. From the old point of view, which regarded the different forms of animate beings as to many separate creations, these had to be considered in all their subordinate parts as expressions of a definite plan of creation and therefore involving a definite use for them, of useless relics there could be no question in this connection. Now, the principle of evolutionary growth and decay, as I have already mentioned on pages XIX and XX of the Introduction to my third monograph, although at the present day almost universally admitted, is in reality still completely misunderstood by a great number of naturalists, whose explanation of vital phenomena actually still proceeds from the old point of view. My explanation in 1905 of the origin of the so-called tails was attacked as completely erroneous by a German systematic lepidopterist who entirely misapprehended the principles of evolution and who represented these appendages as organs of utility in the flight of Lepidoptera. I will not here further reply to this attack; in my book "*Noch einmal mimicry, selection, darwinismus*" I have already dealt with the subject and merely refer to it in order to demonstrate how little the principle of evolution is understood. The same ideas have manifested themselves in the mimicry-fantasy where, assuming in a similar manner *a priori* that these tails must serve a useful purpose, this usefulness was duly discovered. Some small LYCAENAS have the habit, when first settling, of rubbing the secondaries one over the other, the motion being apparently more or less rotary, when naturally the short thread shaped tails of these wings also come into motion. In this manner they were supposed to imitate the antennae, thereby inducing the enemies preying on these small butterflies to direct their attacks upon that part of the body instead of on the head, enabling the insect to escape with only the lower extremities of their wings slightly damaged. This is nothing but a typical mimicry-fantasy and adopted from the original inventor by later observers. It originated, I believe, with WALLACE, the fact itself having been observed by TRIMEN; on page 564 *et seq.* of "*Butterfly hunting in many lands*", published in 1912, it is repeated and elaborated. This still unexplained movement of the secondaries I have myself frequently observed, but with the utmost stretch of imagination I have never been able to see the fancied resemblance; these tails do not bear the slightest likeness to antennae. Only an observer obsessed with the ideas of the theory of mimicry could detect any such similitude; and the predatory insects which prey upon these small LYCAENAS will scarcely be credited with this infatuation.

A study of the Papilionidae clearly demonstrates that the length and form of these appendages may not only differ pretty considerably in individuals of

the same species but that some of them, either of different or of the same sex, possess such tails while others do not, which clearly indicates that an evolutionary process is there in course of operation, causing these appendages gradually to disappear, its stage of decay having proceeded further in one individual than in another, sometimes in one sex or in one of the forms of the same sex. As an indication of specific differences these tails are useless, although, by reason of the same lack of comprehension of evolutionary principles, this is still being done by many systematists. I may here refer to my remarks in the text under LYCAENA ARDATES, Moore. SURENDRA VIVARNA, Horsf. and S. FLORIMEL, Doh., are likewise regarded as distinct species principally on this ground. Purely for the same reason BETHUNE BAKER differentiates between ARHOPALA ATOSIA, Hew. and A. EPIMUTIS, Moore. According to DE NICÉVILLE tailed and tailless races of *Lycaena Malaya*, Horsf. occur, but this is not the case in Java. In *Lycaena Datarica* Sn. the tails, although present, are reduced to a minimum, clearly once more demonstrating the fact that they are gradually diminishing, and thus have almost disappeared. Notwithstanding, as already stated, even generic distinctions continue to be based upon them.

The Lycaenidae are for the most part regular suncreatures, and fly all day, until towards evening the slanting position of the sun makes its warmth less felt. I found it noted somewhere that in order to escape the great heat they place themselves on the underside of leaves in the middle of the day, but this is founded upon erroneous observation. As I have pointed out on p. x of my monograph on the Hesperidae, some of them have this habit and it is also told of the Erycinidae, but it is not the case with the Lycaenidae.

The most conspicuous characteristic of the Lycaenidae is the splendour and richness of there colouring; many of them are ornamented with a beautiful metalic shimmer, and as occurs in no other Rhopalocera except in the American Morphidae. It is therefore natural, that to the naturalist who makes a study of this family, the problem of the nature of these colour phenomena, and of their extreme variety must be of special interest. Conventional science gives no serious solution of these ploblems, on the contrary, it endeavours to conceal its ignorance behind a mist of phraseology of temperature and all manner of other meterological or light—influences, frequently with great self-complacency. A genuine study of the subject, however, has usually been neglected. On the other hand, I have made a serious study of the subject for many years, and have published my conclusions in a quantity of papers. So far with very indifferent success certainly: and no wonder! For in the first place my conclusions were in complete disagreement with the accepted phraseology, and how rare are the minds that are independant enough to be able or willing to move

outside this sphere! And moreover my investigations forced me to attribute the great variety in colouring to evolutionary changes. As to evolution,—as I have repeatedly stated, on p. XIII of the introduction to my first monograph as well as on p. XIX of that to my last monograph,—since DARWIN the word evolution occurs everywhere, but a clear idea of what we are to understand by that term is seldom met with. I was obliged to refer to this just now in connection with the so-called tails of the Lepidoptera. Not only for the general public, but even for most biologists, evolution is a hollow phrase. Whereas formly the changes in animate creatures were attributed to supernatural influences, which were supposed to regulate and control them, it is now thought necessary to regard them as an expression of evolution. But the one is as vague to them as the other. And while I was led to assume that these changes were due to an independent, evolutionary impetus, and did not arise from the pressure of an immediate necessity, that is of utility, or from the influence of surroundings, although these might influence the further development of the process to a certain extent, it was almost impossible for minds steeped in Darwinian or Lamarkian ideas to accept this theory. To many the theory of an independent development seemed necessarily based upon a mystical conception. Naturally if one regards the colour as a phenomenon which is not of evolutionary origin, but created by the above mentioned influences, it is also impossible to understand, how its alteration can be caused by evolution, least of all when the ideas of what is meant by evolution are very vague, as is usually the case. I may refer, for instance, to the idea which I have formerly discussed, that an evolutionary change must necessarily include an entire species, usually the nature of evolution is considered to be quite explained by the Darwinian theory of selection, as it is commonly accepted, frequently with more or less modification; while as a matter of fact it only plays a very subordinate part in evolution. And other similar ideas. Even the mutation theory which attracts so much attention at present rests in my opinion upon a similar error. I shall return to this point presently.

Although I might not, therefore, taste the satisfaction of seeing my theory gain a wide popularity, yet the further I continued my studies, the firmer became my belief in the soundness of my views. I am more than ever convinced that without a knowledge of the process of colour-evolution it is impossible to understand why the colouring, especially in many of the Lepidoptera, displays itself in such rich variety. Sometimes the tints and their shades, especially the way in which they are spread over the surface of the wings, are not the same in races, or in the sexes, and even in individuals of the same sex of the same species, on the other hand sometimes the variety is nearly or completely absent. In fact sometimes, different species, even those inhabiting districts far removed

from each other, display a remarkable similarity in this respect, which serves to show that a great similarity may occur between species even when they do not inhabit the same district, so that there is no question of its being due to mimicry. A study of the above mentioned process is sufficient to enable us to recognise the evolutionary character of the changes of form, and demonstrates that all these differences of colouring are caused by such processes of change, developing at very different periods in different ways, regulated by the susceptibility of the individuals, and subject to all manners of disturbances, but still always proceeding in one definite direction, and as concerns the kind of change and the desired object to be obtained always retaining the same character. For although this distinct tendency cannot always be demonstrated yet this is so frequently the case, that we are justified in assuming that it must always exist, even when it cannot be traced.

I will now proceed to demonstrate this again, by the study of what the Lycaenidae show us in this respect. Before doing so I consider it advisable to devote somewhat more attention to the very important observations made by Prof. Dr. COURVOISIER of Bâle, which I have already mentioned on p. XII of the introduction to the Pieridae, and on p. LIII of that to my third monograph. In various essays, to be found amongst other places in the "*Zeitschrift für wissenschaftliche Insektenbiologie*", *1907*, and in the "*Deutsche Entomologische Zeitschrift Iris*" *1912*, Dr. COURVOISIER has published his observations concerning what he calls "aberations" in the markings of Lycaenidae. Starting from the usual dogmatic point of view, he has taken infinite pains, to fit his observations systematically into the conventional frame of genera, species, variations and aberrations, as well as to think out a corresponding system of nomenclature to distinguish them by. I cannot follow him along this road. Changes in such small patches of colour upon the underside of the secondaries I am well aquainted with, also in the Satyridae, and I have discussed them on p. LIII of the introduction to my third monograph; how they extend themselves in this way can be clearly seen for instance in the drawings of *Debis Dyrta* Felder (plate XVII, 47*a*, 47*b*) and *D. Europa*. F. (plate XVII, 48*a*, 48*b*). But looked at from my point of view these are not aberrations, but merely different stages in a process of evolution, which require neither a systematic arrangement, nor a special nomenclature. Thus, although I cannot share the opinion of my learned friend as to the nature of these patches, yet both his observations in themselves, and his view of them are of great value to me. In very important points these views entirely agree with what I think may be inferred from my own observations.

In the first place, although Dr. COURVOISIER is quite unable to explain

the reason of it, and is apparently very much surprised by it, his observations convinced him that these changes are not merely arbitrary, or caused by casual influences, but follow fixed rules. As a matter of fact this is so, and that because they are neither more nor less than phenomena that appear in the course of an evolutionary process moving steadily in a definite direction. And hereby Dr. COUVOISIER practically acknowledges the principle, which I have always insisted upon, that the great variety of colouring and marking which are shown on the wings of the Lepidoptera, are regulated in their genesis and modification by definite rules, and are nothing but manifestations of natural evolutionary processes.

Furthermore two other observations by DR. COURVOISIER agree equally well with my views, thereby lending them a firm support. On the strength of his observations he considers that it may be regarded as a fixed rule that while in other respects the difference between the various species correspond to the peculiarities of each of them, the aberrations here referred to by him occur in exactly the same manner in all species, without the peculiarities of the species exercising any influence upon it. He does not know how to explain this, but the fact is perfectly correct; the reason being that changes observed by him, are not aberrations at all, but independent evolutionary phenomena, which occur in the same way in every species which possesses the susceptibility to it. I have repeatedly pointed this out; it is the constancy of these changes which proves their evolutionary character.

Moreover DR. COURVOISIER points out quite rightly that it is therefore misleading to give such names to the aberrations as give the impression that they belong to special districts, and are therefore of a local nature; while as a matter of fact they have not in the least that character. Quite true, and the same is frequently the case in the fabrication of sub-species, which are also often based merely upon differences of an evolutionary kind.

The course of the evolution of colour in the Rhopalocera I have treated so often in my former introductions that it may well be considered superfluous to discourse upon it in general terms here. There are, however, some points with regard to it, which still require some discussion.

The pigmental colours which are subject to colour-evolution, red, orange and yellow in various shades, and white, are all found on the wings of Lycaenidae; red, of course, as the oldest colour and therefore most affected by the fading process, only occasionally, as in all Lepidoptera, and white, the most advanced stage of this evolution, the most frequently. They moreover occur in such transitional forms as indubitably prove the existence of this

process of evolution, although not usually side by side on the surface of the same wing, in such a way as to show as clearly how they have succeeded one another in that process, as for instance with the colours and relic-stripes which appear side by side on the wing surface of certain HEBOMOIA species, referred to on p. 35 of my monograph on the Pieridae. Moreover the course of this process does not seem to be the same in one family as in another. While in the Pieridae the yellow stage is very common, this colour is only rarely seen in the Lycaenidae. Orange, in this case, apparently often changes so quickly into white that the yellow stage cannot be observed. At the same time we constantly get the impression that the evolution of colour proceeds gradually, not by sudden changes, or so-called mutation. Where these pigmental colours, therefore, in general appear just as in other Rhopalecera, we may undoubtedly assume that the change of colour in the Lycaenidae is also caused bij the ordinary process of colour-evolution, and in consequence the direction in which the change is proceeding, is known. The white colour found in many Lycaenidae must therefore often be the final stage of this evolution; at the same time it need not necessarily always be so, because, as has been already stated, white may originate in another way. As a special study has not yet been made of this matter, it is often difficult to establish the nature of this colour in Lycaenidae; judging merely by its external appearance, the white does not appear to be of the same kind in all species; but here we are upon unknown ground.

In the case of the Lepidoptera the increase and decrease of the dark pigment plays an important part in the change of colouring; in the Lycaenidae this is also the case. And here it is often difficult to know, whether, when the dark pigment is found upon a surface, it is extending upon it, or diminishing after a former extension. In cases of a strongly marked darkening, an increase of dark pigment is certainly indicated, but where it is only partial or weak it may equally well indicate a partially developed stage in the process of increase, or one in which the completed darkening has again partially disappeared. For the scales which contain the dark pigment, when this is increasing, cover those in which the other pigmental colours are found; on plate XV fig. 30*g* in my monograph on the Satyridae, the way in which this takes place in *Cyllo Constantia* Cram is represented. On Plate XV fig. 30*g* is shown a colour form of a nearly related species, when the darkening is greatly decreased, and the sub-lying colour is partially visible again, especially on the under surface. As a rule it is in a much faded condition, as the process of colour-evolution has not stood still with the underlying pigmental colours during the time that they were covered over, which may have been a very long period; for example in CYLLO LEDA L. what was red at the time

of covering, has faded to a pale yellow by the time that it becomes more or less visible again. On this account the relative paleness of the colours upon a surface upon which dark pigment also appears, is sometimes an indication as to whether the latter is in the evolutionary condition of increasing or of decreasing. It is not however a certain one, as the darkening is sometimes confined to only a portion of the surface.

Another help in estimating the evolutionary stage of the wings, lies in the colour relics, if these are present. Just as the study of the so-called tails of Lepidoptera leads to the conclusion that these appendages which appear in a great variety of forms, are nothing but the remains of the former more extensive form of the wings to which they are attached, and which have been affected by an evolutionary diminishing process, in the same way colour relics are sometimes found as survivals, still present upon the surfaces, of tints that were formerly present, but which have subsequently partially or completely been destroyed by the process of colour-evolution. Such colour relics have been repeatedly discussed in the introduction to my third monograph. For example the intense darkening of the upper surface of *Cyllo Leda* L. (see Plate XV fig. 30*e* and 30*f*.) allows spots of red, sometimes already faded to yellow, to be seen on the wings of some individuals, as survivals of the former colour of the whole; similarly, on the primaries especially, of many forms of Iphias (Hebomoia) parts of the originally general colour remain, as larger or smaller patches of colour which in some females, further advanced in colour-evolution, have already been replaced by a uniform white colour. A particularly interesting relic-stripe is that which I have drawn attention to on p. 35 of my monograph on the Pieridae as sometimes left upon the upperside of the primaries of Iphias Glaucippe L. and clearly showing how the succession of colouring has taken place. It can plainly be seen here how an old colour, pushed aside by a new one, is gradually reduced to a narrow stripe, which is finally completely replaced by the new colour. Similar colour relics are also found among the Lycaenidae sometimes as surviving spots of colour, sometimes as narrow stripes, insignificant to the unitiated, the meaning of which becomes clear, however, when interpreted by the above mentioned results of the study of the Pieridae. These relics often make the course of the colour-evolution clear; when we know what the former colour stage has been, we can conclude in which direction the process of change is moving.

In one remarkable group of the Lycaenidae, peculiar to the Indo Australian fauna, the Gerydinae, a relic-stripe of this kind is found, which throws much light upon its evolutionary history. The butterflies of this group are sharply distinguished from the rest of the Lycaenidae by their abnormal legs; a few

observations made upon Allotinus Horsfieldi Moore, and referred to in the special discussion of this species, gives us reason to believe that this is connected with their mode of life. In the same way it is not unlikely that, while Lycaenidae in general are very fond of the sun, the butterflies of this group, like many Satyridae, prefer a half darkness; the brilliant colouring so characteristic of the Lycaenidae, is not found in this group, they are more brown and grey in colour, and it is not improbable as we shall show later, that a strong development of the structural colours is connected with strong light. The Miletus Symethus Cram, found in Java is accordingly grey or brownish, on the upperside in particular dark brown, but there is also on the upperside of the primaries sometimes a great deal of white, usually, however, only in the female. It occurs occasionally in a male, but in these it is usually covered by a dark pigment, in very varying degree in different individuals, so that some differ very little from the female, while in others the white remains only as a small spot; and between these two extremes it is found in less and greater degrees. If a number of butterflies of this last kind are inspected, it becomes plain that the white upon the upperside is in a state of change, which in some individuals is just beginning, in others has proceeded further, while in yet others it is very far advanced. A process which always follows exactly the same line of development. The question then arises, whether this process consists in a gradual increase of white, or on the contrary in an increase of the dark pigment such as to cause a gradual decrease of the white? In which of these two directions is the process moving? At first sight one seems as likely as the other. The butterflies of this species, in proportion as the process is advanced, appear as a series, in which at the one extreme white is most, and at the other least preponderating. In the female white takes up not only a large part of the upperside of the primaries, but is found on the same side of the secondaries, here differing in extent in different individuals, and often assuming the elongated from that indicates the encroachment of the surrounding darker pigment, which ultimately must lead to a narrow relic stripe only being left. And this we actually find upon the upperside of the secondaries of many males of this species, in a faint white stripe partially covered by the darker scales, thereby demonstrating that the evolutionary process in this case consists in an increase of the darker pigment, which gradually covers over the white. The most advanced condition is, therefore, found in the males, in whom the white has been reduced to a small remnant. (See Plate XIX 8*b*,*c*,*d*,*e*,*f*). This is further confirmed by a similar relic stripe that is found in Allotinus Horsfieldi Moore, (Pl. XIX, 12*a*,*b*, 14*a*) A. Portunus, de Nic. (Pl. XX, 18*a*) and some other species of the related Gerydinae-genus Allotinus Felder, in

these cases upon the upperside of the primaries (see Plate XIX, 12*ab*, 14*ab*, 18*a*), in the same place, that is, as where the white remains the longest in the males of Miletus Symethus Cram. This stripe, also, presents just the same condition, a far advanced covering of the white by a darker pigment. But, for the rest, there is here a great difference. In the Allotinus species, it is not only the males that are so far advanced in the darkening process, but the females also, and these even to a greater extent. For the Allotinus females are even darker than the males, the dark pigment is more predominant, and the relic-stripe is even more indistinct than in the males, the white seems to be still more reduced, and almost to have completely disappeared. In these species it is therefore clear that the females are further advanced in the evolutionary process of darkening than the males and therefore that they probably entered upon it earlier, showing thereby that they were more susceptible to it. Here we have, as regards this evolution, what is called sexual prefonderance, in the Miletus species masculine, and in the Allotinus species feminine.

Thus it may be seen that the study of these relic-stripes is very illuminating. It makes it clear that the change of colour in the Lepidoptera is an evolutionary phenomenon. It shows moreover that the course of such an evolutionary process is not always the same, that in nearly related species it may occur in the one while the other remains unchanged, and that where it occurs it may develop much more rapidly in the one sex than in the other, so that either of the two sexes may occupy the more advanced stage, and that in this respect the initiative of the male sex which was formerly maintained, does not exist. It shows that the susceptibility to such evolutionary processes differs not only according to the species, but also according to the sex and even the individuals. And finally, that the course of such processes is very gradual, at least as a rule, and by no means takes place by sudden charges, so-called mutations.

Other species of Allotinus, seem however im this respect to be in a different condition. One species A. Subviolaceus Felder, (Pl. XX 20*a*) precisely resembles many Lycaenae in which the dark pigment is decreasing; like these it shows a faint structural colouring upon the upperside of the primaries. In another species A. Nivalis Druce (Pl. XX 19), the upperside shows a brownish colour such as is caused by darkening in the above mentioned Allotinus species, but the underside is almost entirely white; dark pigment hardly exists, it is chiefly represented by a peculiar circular black spot. Similar spots are also found in various species of Lycaena, in L. Hylax F. (Pl. XX 29*ab*) and L. Malaya Horsf (Pl. XXI 62*ab*), for instance, and especially in L. Puspa Horsf. (Pl. XXII 74*ab*), in the last they are unmistakably a relic, the remains of a former general darkening. This compels us to attribute the circular spots in

other species, including those in ALLOTINUS NIVALIS Druce to the same origin, from which it must follow that in this last species of ALLOTINUS the dark pigment is in a decreasing condition. For although at first sight it may appear arbitrary to attribute the same origin to spots which appear in different species, merely because they are of the same shape, yet as a matter of fact there are good grounds for this. If, as I hope to demonstrate later on, we are brought to the conclusion that all the forms in which colour-evolution displays itself, follow fixed evolutionary laws, although being exposed to and influenced by countless disturbances, they express themselves in a great variety of ways, then we must also assume that, where the same very characteristic forms appear, they point to a similar development of the process of colour evolution. The influences to which I refer are extremely numerous and variable, and it is therefore hardly probable that they should display themselves in different species in the same very characteristic way, during the course of the process of development.

Moreover such an intensely black circular spot must undoubtedly be the product of a massing of dark pigment, which can hardly occur where it is still in a condition of gradual increase, but which indicates that an accumulation of it has taken place; these accumulations will only disappear after the pigment has vanished from those places, where it was not so thick. In many LYCAENIDAE there are other black spots of larger or smaller size, but they are not of this peculiar circular form, but of a more irregular shape. These must certainly be regarded also as accumulations of pigment, and presumably they do not differ in nature from those described above. On the other hand it is difficult to determine whether in L. ROSIMON (Pl. XX 33*ab*) F. the dark pigment is in the increasing or decreasing stage. This pigment shows itself in a peculiar way in this species; in TARAKA HAMADA Druce (Pl. XX 28) it is about the same. But in the first mentioned species, especially in the female, this characteristic accumulation of dark pigment along the costal margin, the outer margin and the apex of the upperside is unmistakably recognisable, which, as will be explained later, is found in so many LYCAENIDAE, especially in the females. And in these it certainly suggests that the pigment is extending. But this may be deceptive, the contrary is also possible.

In L. PLINIUS F. (Pl. XX, 34*ab*) the female, as also the underside of the male, is marked very similarly to the species mentioned above, but the upperside of the male is completely darkened, and displays a structural colour. This makes the explanation again difficult. As has already been remarked, it is in many cases difficult to make out, whether the dark pigment is increasing or decreasing, as well as, when the increase has begun, what stage the other process of colour-evolution, namely that of fading, had attained, when

the extension of the dark pigment began. In a great many Lycaenidae, especially in the numerous species which SNELLEN includes in his genus LYCAENA, it can be clearly seen that, as a rule, the females are more lightly and whitishly coloured, especially on the upperside, than the males; and that in connection with this, the structural colours, which are found so frequently in the Lycaenidae, when they are present in the male, disappear in the female or at least become much fainter. We find this even amongst the ARHOPALA species, although in this case the females are also very darkly coloured, and the above mentioned extension of dark pigment along the costal margin, the outer margin and the apex of the upperside of the forewings is very common in the female. This cannot be strictly speaking sexual, as it occurs in the ♂ of LYCAENA BOCHUS (Pl. XXI*a*) Cram., L. QUADRIPLAGA Sn. (Pl. XXII 72*a*) and L. MARGINATA de Nic (Pl. XXII 73*a*), for instance, but it appears so often in the ♀; that it is generally acknowledged as a female characteristic, and is even often erroneously regarded as a secondary sexual phenomenon. Why should this be so? Observation shows that the same fading process of colour-evolution which shows itself in all Rhopalocera, although in many species it is already accomplished, or is invisible on account of the accumulation of dark pigment, also governs the Lycaenidae, and therefore originally, when the evolutionary fading took place, must have played an important part in it. Little of the original red colour now remains; certain species, however, have stopped when more or less advanced is this stage of colour evolution. This is so amongst the Pieridae, with PIERIS NERO F. and related races. There are also some amongst the Lycaenidae. In CURETIS INSULARIS Horsf. ♂ (Plate XXIV 120*ab*) the original red colour is still preserved upon the upperside, although the underside has become completely white, but in the ♀ this red has been partially crowded out by the spreading of the dark pigment, and is further perceptibly faded; in this species therefore the fading process is on the upperside still progressing, and is most advanced in the female. In other Lycaenidae, where the original red still remains, as in DEUDORIX JARBAS F. (Pl. XXV 133*eb*) it is very distinct on the upperside of the male, but in the female it is considerably faded. Judging by these cases, it becomes very probable that in other cases, where the colour of the upperside of the ♀ of one species is conspicuously lighter than that of the ♂, it is the consequence of the same process of fading, which has proceeded further in the ♀ than in the ♂. But very soon after the fading had begun an extension of the black pigment over it seems to have commenced as may be seen even in the ♀ of the above mentioned CURETIS INSULARIS Horsf. (Pl. XXIV 120*b*) which is still so little faded—causing a darkening of the upper surface, where moreover the even mentioned concentration in the apex, costal margin, and the

outer margin, already existed. This is so common in the ♀, that, as already said, it is frequently regarded as a female characteristic, although it is also found amongst others in the above mentioned males of Lycaena Bochus Cram. (Pl. XXI, 48*a*) L. Marginata de Nic., (Pl. XXII, 72*a*) and L. Quadriplaga Sn. (Pl. XXII, 73*a*). The simple fact is that in this darkening process a greater susceptibility of the ♀ sex is revealed as preponderance, whereby it has proceeded very generally in the ♀ as a rule, while so far only in a few species the ♂ has changed in the same direction. By this means an accumulation of dark pigment has formed, such as is mentioned on p. L in the introduction to my third monograph.

Upon the upperside of the ♂ which must also have been complete darkened, but as a rule in a more even way, a structural colour must have established itself, owing to the great susceptibility or predisposition for it in the Lycaenidae.

Afterwards a retreating of the dark pigment may have begun, such as may be as unmistakably recognised in Cyllo Leda L. (Plate XV, 30*f.g.*), this evolutionary change having again proceeded further in the ♀ than in the ♂. The consequence of this must have been, that the darkening in the ♀ has again vanished to a great extent, except in the accumulation at the apex, costal margin and outer margin already referred to, which has given a more intense character to it, forming what I have formerly called a "persistent spot;" for the rest, in proportion as the darkening clears away, the underlying colour appears again, having in the meantime faded very considerably. That the original pigmental colour is not lost, even when an intense structural colour is formed over it, is shown clearly by the vivid structural blue of the ♂ of Poritia Erycinoides Felder (Plate XX, 23*a.b.*); in fact, as this colour disappears in the female, the red, in a faded condition, reappears again. In the faded colouring, often a great deal of white is already seen, which increases during the further progress of the change. In the ♂, on the other hand, the uniform darkening which is covered by a structural colour, seems often to have persisted, but not seldom to be much diminished in intensity, which is shown, as I believe, in the different and often much lighter shades which the structural colour assumes in the various species which have reached different stages of this evolution; where there is still a thin layer of dark pigment, it becomes brownish, more or less mixed with blue, and where the darkening has quite disappeared, the structural colour, if it has been preserved, becomes a clear, sometimes even a very light blue. This is why, where this kind of blue occurs, showing that the evolutionary fading is already far advanced, the upperside of the underwings has often, and the underside of both wings frequently become quite white. I consider that the colour process in the above mentioned Lycaena Plinius F. could also

be more satisfactorily explained in this way. On the upperside of the ♂ there is still darkening, as shown by the light brownish structural colour, which in the ♀, and on the underside of both sexes, more even in the ♂ than in the ♀, has already to a great extent become white.

In this species also, therefore, the darkening would be diminishing, and allowing the original colour, faded to white, to reappear in many places. The great difference in shade of the structural colour in the various species would then be explained; they would have to be considered as dependent upon the condition of the pigmental colours over which they extend.

My former opinion, expressed for instance upon p. XVI of my third introduction, that the structural colours were entirely dependent upon the form of the wing scales, would thus need revision. As a matter of fact, in itself it is incomplete; not only the form of the wing scales is of importance here, but also the way in which they are placed on the surface of the wing. But considering what a specialist as Dr. B. WALTER says upon this subject in his work "*Oberflächen—oder Schiller—Farben*" (1895)—I do not consider my present view to be impossible. I cannot however discuss this, or the general question of the nature of structural colours further here. I must also, for the present, leave the question of whether the influence of light plays a part in this, which seems to me by no means improbable, in consideration of the experiments by POULTON on the colour of the pupae of Rhopalocera, discussed in the introduction to my third monograph. To be able to form a judgment upon this matter, it would be necessary first to undertake a special physico—entomological research, which, as far as I known, has not yet been done, and which I am not able to undertake.

In the same way an explanation can be given of the phenomenon that is so striking in the LYCAENA STRABO F. (Pl. XXII, 63*a.b.*). There are two colour-forms in the males of this species. While there are no differences in the underside of the ♂, nor in the ♀, nor in the larvae or pupae, yet in the same places and at the same time males are found that have a bright blue structural colour on their upperside, and, simultaneously, others which are distinguished under the name of LITHARGYRIA Moore (Pl. XXII, 64*a*) in which the blue is very whitish; both shades being consistently as different as between many different species. Our theory would explain this otherwise enigmatical phenomenon; in this species also, the fading process is evident, the underside even of the ♂ has become very light in colour; we may assume that on the upperside too of the ♂ this process has reached an advanced stage, in some individuals having gone so far that the structural colour has also assumed a much lighter shade. In the male of ARHOPALA EUMOLPHUS Cram (Pl. XXIV, 103*a.b.c.*) the

same phenomenon may be observed. I possess specimens of these species from Java, the upperside of which is bright shiny emerald green, others in which the green is apparently mixed with yellow, thereby becoming much paler, and one that is a still lighter shiny yellow copper colour. This shows what a mistake it is to distinguish races or ever species by such shades of colour. BETHUNE-BAKER has correctly observed that shades differ sometimes in the same species, but found no explanation for it.

This would also explain the mutual relation of three species L. CELENO Cram (Plate XX, 36*a.b.*), L. ALEXIS Stoll (Plate XX, 37*a.b.*) and L. CLEODUS Felder (Plate XX, 35) which so far has been a regular puzzle, and cannot be understood without a knowledge of colour-evolution. In all these three forms the genitalia are the same, which although it is not enough to justify them being regarded systematically as the same species, certainly shows that they must be very nearley related. They resemble each other externally also so much, that most writers do not even reckon L. ALEXIS Stoll as a separate species, but regard it as a form of L. CELENO Cram belonging to the dry season. This is another of the not uncommon lepidopterological legends, which the one writer copies from the other; for, apart from the fact that such well defined and constantly different forms in the dry and rainy season in Java do not occur in any species, I possess eight specimens of L. CELENO Cram, captured in Batavia, Buitenzorg and the Bantam mountains, in August and September, that is the middle of the dry season, which in no way differ from my specimens taken in various months of the rainy season. The only real difference between these three kinds is that on the upperside the colour of L. CLEODUS Felder is a distinct shiny blue, although of a light shade, while that of the two other kinds is decidedly white with only a faint bluish shade, which is even absent altogether in many specimens. This difference of shade can be clearly seen on inspection; it can be best expressed perhaps by saying, that L. CLEODUS Felder is whitish blue, while the other two are bluish white. A further distinguishing mark of L. CLEODUS Felder is supposed to be that the colour of the markings on the underside of the secondaries is visible upon the upperside; but this distinction is erroneous, the same phenomenon is found in many specimens of L. CELENO Cram also. The ground colour of the underside of L. CLEODUS Felder is greyish brown, usually distinctly darker than in L. CELENO Cram, while the shade of L. ALEXIS Stoll is still lighter and more whitish, and the same design of vertical white lines is visible on the underside of the primaries of all three. In L. CELENO Cram the two innermost of these vertical lines are somewhat variable in their relative position; whether this is so in L. CLEODUS Felder I am unable to say, owing to insufficient material of this form. In L. CLEODUS

Felder there is a fine white line along the inner edge, where the vertical stripes meet it; in L. CELENO Cram this stripe is distinctly broader and the vertical stripes at their lower end near this line are more or less, sometimes conspicuously, broadened; finally in L. ALEXIS Stoll, not only is the ground colour of the primaries on the underside, as we have said, more whitish, but the white of the stripes has often spread so much (see the picture of the female in Plate XX, 37*b* especially) that it has often partially covered the markings and made them indistinct.

Taking all this together, we can see that each of these forms merely represents a different stage in the course of the process of evolutionary fading; the replacing of the original colour by white is least in L. CLEODUS Felder, in L. CELENO Cram it is somewhat further advanced, and in L. ALEXIS Stoll. it has gone furthest; which can be seen most clearly on the underside, but is also manifested on the upperside, where the most blue is found in the first mentioned butterfly, while it has almost disappeared in both the others.

This differentiation is therefore of so little importance that in my opinion the three forms may be regarded as three races of the same species, which should bear the name of the oldest one L. CELENO Cram, that is, if further cultivation shall confirm, that CLEODUS Felder and ALEXIS Stoll. reproduce themselves as such, which is not certain yet. Each of these forms will finally, when the colour-evolution has proceeded so far as to make it quite white, have become the same as the others, so as to loose its individuality; unless in the mean time, in one of them, another differentiation has arisen which would make a separate species of it. Other so called species of Lycaenidae also I believe a knowledge of colour-evolution will enable us to reduce to subsidiary forms of one species.

A well kwown group of these LYCAENAE, that which is often distinguished as CYANIRIS, forms a very good example of this fading process, and the very uneven manner in which it proceeds. All the species included in it apparently are derived from one stock form and are passing through the same process of colour-evolution, which causes the colour which was peculiar to the original stock to fade to white; a process in which the females are much further advanced than the males, and in which therefore, female preponderance reigns. But the process runs its course independently not only in each species, but even in both sexes of the same species and in individuals of each sex, while in one species transformation to a more advanced stage of colour change takes place much earlier than in another. So that in the same species there arises a difference in colour between the sexes, and even between individuals of either sex. As, however, the process of change is the same in all the

species, the consequence is that not only do all the species resemble each other very closely in general, but in particular there may be a strong resemblance between forms of one species and those of another, when these happen to be in the same stage of colour-evolution: When the evolutionary process has reached its end, all these species will have become quite white, and therefore, as regards colour, will be indistinguishable.

In eight of the CYANIRIS species found in Java, this process can be followed pretty clearly by means of the accompanying illustrations.

According to the general rule of colour-evolution which we have already noticed above, the original colour must have been red, which later, on the upperside at any rate, has been completely covered by a dark pigment, after which a structural blue has been superimposed upon this. This procedure can be observed in PORITIA ERYCINOIDES Felder, in which the blue structural colour, still surviving in the ♂ (Plate XX, 23*a*), has disappeared in the ♀ (Plate XX, 23*b*), while the original red, although considerably faded, has re-appeared. After the darkening and the accompanying structural blue had proceeded for a longer or shorter period, the fading process must have begun, with female preponderance, first with the female, so that in this sex it is conspicuously further advanced than in the male, and also earlier on the underside than on the upperside, and upon the secondaries than upon the primaries. Thus the original colour was little by little destroyed. Of this darkening there are now the following remains: Upon the upperside of the primaries a broad black band along the costal margin, the outer margin and the apex in both sexes of L. MARGINATA de Nic. (Plate XXII, 73*a.b.*) L. QUADRIPLAGA Sn. (Plate XXII, 72*a.b.*) and L. COSSAEA de Nic. (Plate XXII, 75*a.b.*); in the ♀ of L. CEYX de Nic. (Plate XXII, 79*b*), L. COALITA de Nic. (Plate XXII, 77*b*) and L. PUSPA Horsf. (Plate XXII, 74*b*); while in the ♀ of L. CATREUS de Nic. (Plate XXII, 78*b*) this band extends along the inner margin as well. In the ♂ of L. CYANICORNIS Sn. (Plate XXII, 76*a*) and of L. PUSPA Horsf. (Plate XXII, 74*a*) the band is considerably broadened; along the outer margin only, while in the ♂ of L. COALITA de Nic. (Plate XXII, 77*a*) it has shrunk to a thin stripe. Amongst the ♂ of L. CEYX de Nic. (Plate XXII, 79*a*) some still have the broadened band, while in others it has become a narrow stripe.

The same bands are strongly developed upon the upperside of the secondaries in the ♂ of L. QUADRIPLAGA Sn. (Plate XXII, 72*a*) and the ♀ of L. COSSAEA de Nic. (Plate XXII, 75*a*), while in the ♀ of L. CATREUS de Nic. (Plate XXII, 78*b*) it extends along the inner margin also, but in other species it is only seen along the costal margin or the outer margin, and sometimes then only faintly.

As regards the underside, the dark pigment appears along the outer

margin of L. CATREUS de Nic., especially in the ♀, (Plate XXII, 78*b*) where it often shows through from the upperside, but the surface of both wings has otherwise largely faded to white, upon which this pigment only survives as numerous little spots, while in L. PUSPA Horsf. (Plate XXII, 74) and L. COSSAEA de Nic. (Plate XXII, 75) it is partially concentrated into the circular spots already referred to. It is remarkable, that in this respect, when the underside of different species has become very white, the arrangement of the small surviving black spots still distinguishes the different species, but that they do not differ in the sexes of the same species. This may be seen, for instance, on the underside of the ♂ of L. CEYX de Nic. (Pl. XX, 79*a.b.*) and L. CYANICORNIS Sn. (Pl. XX, 76*a.b.*) ♂ and ♀, although it is not shown very clearly in the accompanying illustrations.

The structural blue, which has subsequently covered the darker spots, at least on the upperside, is still found on the upperside of both the wings of the ♂ in L. COALITA de Nic. (Plate XXII, 77*a*), L. CATREUS de Nic. (Plate XXII, 78*a*), L. CYANICORNIS Sn. (Plate XXII, 76*a*), L. PUSPA Horsf. (Plate XXII, 74*a*), and L. COSSAEA de Nic, (Plate XXII, 75*a*) in various lighter and darker shades, according as the sublying pigmental colour is more or less faded. Further in the ♂ of L. CEYX (Plate XXII, 72*a*) on the primaries only, while upon the secondaries, which have already become white, it is only found as a relic colour. As such it is also found in a greater or lesser degree upon the upperside of both wings in the ♂ of L. MARGINATA de Nic. (Plate XXII, 73*a*), the ♀ of L. COALITA de Nic. (Plate XXII, 77*b*), L. CYANICORNIS Sn. (Plate XXII, 76*b*), L. CEYX de Nic. (Plate XXII, 79*b*), and L. COSSAEA de Nic. (Plate XXII, 75*b*).

White, finally the most advanced stage, has more or less absorbed both wing surfaces in some species, as in both sexes of L. QUADRIPLAGA Sn. (Plate XXII, 72) and in the ♀ of L. CEYX de Nic. (Plate XXII, 79*b*) while in others, as the male of L. CEYX de Nic. (Plate XXII, 79*a*), it covered the upperside of the secondaries only, and in yet other species, such as both sexes of L. CYANICORNIS Sn. (Plate XXII, 76), only the underside. Various of the accompanying illustrations show this plainly enough. In some species the white is, as it were, breaking through the blue, causing the darkening and with it the structural colour to disappear. This process is clearly further advanced in one individual than in another, as e. g. in the ♂ of L. COALITA (Plate XXII, 77*a.b.*), in L. CEYX de Nic. (Plate XXII, 79*a*) and L. PUSPA Horsf. (Plate XXII, 74*a*) also this is found on the upperside of both wings.

Thus we see clearly, how one process of colour-evolution governs all these species, always approaching the same object in the same way, but working independently and therefore very unequally in each species, sex and even individual.

A similar process seems to have worked in LYCAENA ROXUS Godt (Pl. XX, 30), L.ELNA Hew (Pl. XX, 31) and L. ETHION Dbld., (Pl. XX, 32*a.b.*). Upon the underside of the butterflies there are black stripes and spots, the very various shapes of which strongly suggest that they are relics, as in the case of the great variety of shape shown by the so-called tails of the butterfly wings, which are also relics. When black is extending, as a rule at least it proceeds more evenly. There are also LYCAENA-species, such as L. AKASA Horsf (Pl. XXII, 71*a.b.*) and L. CELENO Cram, (Pl. XX, 36*a*) which are almost entirely white, or have only on the underside faint survivals of the former colour, much mixed with white. In alle these species and especially in the ♀, there is however still some dark pigment remaining upon the upperside, and that in just those places which I have said above I regard as persistent spots. This, again, indicates that the pigment is decreasing.

The underside of the Lycaenidae, except where the fading process is so far advanced that it has become entirely or almost entirely white, also demonstrates the process very clearly, while there too the increase or decrease of the dark pigment may be seen. This process is however seldom the same as that on the upperside or has any connection with it at least; usually the changes go their own way independently upon each of the wing-surfaces. On page XLIX of the introduction to my third monograph I referred to this fact, principally in connection with an observation made by BATESON. In SNELLEN'S genus LYCAENA the colour of the underside is usually lighter or darker brown, with more or less pronounced spots or stripes. At a certain stage of development peculiar white stripes often appear, corresponding in a very remarkable way not only in the sexes, but in related species, and as such displaying such a systematic whole as unmistakably demonstrate that the course of this process is not regulated by chance, but by fixed definite rules.

In LYCAENA CELENO Cram (Pl. XX, 36) and L. SATURATA Sn. (Pl. XX, 39) for instance the same stripes appear in the same arrangement, similarly in LYCAENA ELPIS Gdt, (Pl. XXI, 41), L. KONDULANA Felder, (Pl. XXI, 43), L. KANKENA Felder, (Pl. XXI, 44) and L. CUNILDA Sn. (Pl. XXI, 42) they are the same.

This seems to show, that under the same circumstances, such as must normally exist in both sexes of the same species and even in related species, the development of the colour-evolution also follows the same course; and therefore, where this is not the case, it is due tot abnormal circumstances which have been caused special disturbances. In many ARHOPALA-species something the same may be seen, but in the place of these stripes there appear spots of different shapes, which are the same for both sexes of one species, and thus point so

distinctly in the same direction, that it cannot possibly be considered as accidental.

We have mentioned above, how the fading process of colour-evolution from red through orange and yellow to white, also governs the Lycaenidae, but at the same time we remarked, that this was not now easy to perceive in many of them. I shall now draw attention to various species in which it is very clearly shown. Red is still found on the upperside of the ♂ of Cyrestis species; in the ♀ of C. Insularis Horsf. (Pl. XXIV, 120*b*) it has already faded to orange, which clearly shows the working of the evolutionary fading process; the underside has completely faded to white. In Deudorix species, such as Jarbas F. (Pl. XXV, 133*a*) and Xenophon F. (Pl. XXV, 135*a*) the ♂ are still red on the upperside, while the colour of the ♀ is already faded. In Ilerda Epicles Gdt. (Pl. XXV, 122), there are distinct relics of red on both sides; here and there, in various Lycaenidae also small relics remain in the form of small persistent plots, as I call them, upon the underside.

Orange occurs upon the underside of many species, sometimes very distinct, as in the ♂ of Neocherita Hypoleuca Hew. (Pl. XXVI, 155) and the ♀ of Sithon Nedymond Cram. (Pl. XXVI, 142*b*); in others, as Hypolycaena Thecloides Felder (Pl. XXVI, 159) it is pale and strongly tending to white in both sexes. It is also often found, like red, as relic colour in spots upon the underside, and in Lycaena Parrhasius Felder (Pl. XXII, 67) upon both sides. Yellow, which plays such an important part in the colour-evolution in the Pieridae, has remained very seldom as a colour-stage in the Lycaenidae. Here the orange seems usually to change directly into white. On the underside of Ilerda Epicles Gdt. (Pl. XXV, 122) and of the ♀ of Deudorix Barthema Dist. (Pl. XXV, 134*b*) however, yellow is found.

White is extremely general; this furthest advanced stage of colour-evolution has been reached by very many Lycaenidae.

It must be owned that the colours are seemingly in great confusion in the Lycaenidae, which is partly accounted for by the fact already mentioned, that the colour process frequently goes on independently upon each of the wing-surfaces, the upper and the under, accompanied by the more or less marked evolutionary increase or decrease of the darker pigment, and the presence of structural colours. Moreover the difference between species, and between the sexes of the same species causes great irregularity of colour; although this does not play a very important part here.

It will not be superfluous to add one or two things here, which will at the same time serve to illustrate the apparent confusion above referred to. In Yasoda Pita Horsf. (Pl. XXVII, 177*a.b.*) there is little difference in colour between the ♂ and the ♀, but on the upperside of the secondaries of the ♂

there is a vertical dark stripe, which is not present in the ♀, but is replaced by a small horizontal somewhat curved dark line. It would be natural to regard these as special marks of sex, but such markings are by no means certainly dependent upon sex. In SITHON NEDYMOND Cram. (Pl. XXVI, 142*a.b.*), a butterfly where the sexes differ very strongly in colour both upon the upper- and the underside, a similar black stripe is found upon the underside of the secondaries of both sexes. This very characteristic marking, which is found in no other of the Javanese Lycaenidae, is apparantly of the same nature as that in YASODA PITA Horsf. and yet is not a distinguishing mark of sex here, but one of species. As I have remarked above, the stripes on the underside of the wings of many Lycaenae do not differ in the two sexes of one species; yet they cannot be regarded as distinctive of the species, like those mentioned of SITHON NEDYMOND Cram., as they are sometimes common to different related species. The darkening of costal margin, apex and outer margin on the upperside of the ♀ common in many Lycaenidae, is also not a sexual characteristic, because, as already said, it is not a phenomenon of so-called female preponderance, but is also found in the ♂ of a few species. A similar characteristic type of darkening of the upperside is found in the ♀ of different species such as DEUDORIX LAPITHIS Moore. (Pl. XXV, 123), and MALIKA Horsf. (Pl. XXV, 124), HYPOLYCAENA ERYLUS Gdt. (Pl. XXVI, 158*b*), AMABILIS Martin. (Pl. XXVII, 161), NEOCHERITA MANDERINUS Hew. (Pl. XXVI, 156), JOLAUS JALINDRA Horsf. (Pl. XXVI, 153*b*), SITHON NEDYMOND Cram. (Pl. XXVI, 142*b*) and others, while it does not exist in the ♂; but it appears in both sexes including therefore the male, in CHARITRA FREJA F. (Pl. XXVII, 174), DRUPADA THAZIS Hbn. (Pl. XXVII, 169) and HYPOLYCAENA THECLOIDES Felder. (Pl. XXVI, 159). Here, again, female preponderance is doubtless the cause of it. But where there is no question of female preponderance, the way in which the colours appear in connection with the sexes in many Lycaenidae seems very confused. In the following examples both sexes are almost the same on both surfaces: LOXURA ATYMNUS Cram. (Pl. XXVII, 176), DRUPADA THAZIS Hbn. (Pl. XXVII, 169), CHERITA FREJA F. (Pl. XXVII, 174), HYPOLYCAENA THECLOIDES Felder. (Pl. XXVI, 159), LYCAENA ROXUS Gdt. (Pl. XX, 30) LYCAENA ELNA Hew. (Pl. XX, 31) and LYCAENA AKASA Horsf. (Pl. XXII, 71*a.b.*). In the following the uppersides are different, but the undersides the same in both sexes: JOLAUS LONGINUS F. (Pl. XXVI, 148*a.b.*), DEUDORIX JALINDRA Horsf. (Pl. XXVI, 153*a.b.*), DEUDORIX LAPITHIS Moore. (Pl. XXVI, 123), ZELTUS ETOLUS F. (Pl. XXVII, 163*a.b.*) and DRUPADA RAVINDRA Horsf. (Pl. XXVII, 168*a.b.*) and finally in HYPOLYCAENA ERYLUS Gdt. (Pl. XXVI, 158*a.b.*) and SITHON NEDYMOND Cram. (Pl. XXVI, 142*a.b.*) the sexes differ on both sides.

And while the upperside of the ♀ of SITHON NEDYMOND Cram. is, as already said, the same in colour as e. g. that of the ♀ of NEOCHERITA MANDARINUS, Hew. (Pl. XXVI, 156) its underside resembles that of many species which have there a great deal of orange, but not that of the just mentioned NEOCHERITA, which in its turn has a range of colours very closely allied to those of the ♂ of SITHON NEDYMOND Cram. the upperside of which coincides more nearly with the ♂ of DEUDORIX SPHINX F. (Pl. XXV, 129*a*); more cases of the same kind could be quoted.

All this certainly makes the impression of great confusion. Yet through it all we have repeatedly met with phenomena which seem to indicate a definite tendency in the process of colour-evolution, a leading purpose, so to speak. The characteristic stripes upon the underside of many LYCAENAE, the peculiar spots in the same place in the ARHOPALA species can only be understood in that way; they appear too frequently to permit us to doubt of their being the expression of a normal process which, under normal circumstances, will always manifest itself in the same way, and only in abnormal circumstances will be expressed in a different way, that is, when disturbances of whatever sort they may be, exercise an influence upon the normal course of the changing process. For here also, the same thing is true, as we have already said about the circular spots; a repeated recurrence of the same form points to the same cause, and, therefore, the normal course of the process will always bring about the same phenomena while deviations from it caused by various disturbing influences will appear in all manner of ways in the phenomena, which are caused by the process.

The way in which the gradual disappearance of the darkening process can be followed in many LYCAENAE, as already described, plainly shows that this process runs a regular course, not governed by caprice, but one which develops unequally in the different species and sexes, although always tending in the same direction. If we return to the above mentioned group of the GERYDINAE we find there such a remarkable example of the regularity with which the evolutionary process of darkening develops, as removes all possibility of doubt that it proceeds in a definite direction as if governed by a steady plan. I have mentioned it in the text, but I think advisable to quote it rather extensively here, that in MILETUS SYMETHUS Cram. (Pl. XIX, 8*a*) the darkening of the ♂ proceeds in such a way, that the white spot on the upperside of the primaries, which is still fairly large in the ♀, is gradually compressed into an insignificant relic. The ♂ which are least advanced in this evolutionary process, do not differ much from the ♀ with respect to this white: this is the form which I have marked as B (Plate XIX, 8*b*); in those ♂ from

Batavia which are further advanced in this respect than form C (Plate XIX, 8*c*), this white spot has been vigorously attacked by the darkening process, whereby the lower part forms itself more and more into a peculiar white stripe, still connected, however to the rest. In ♂, that are still further advanced, form D (Plate XIX, 8*d*), the process has gone so far, that the darkening has, as it were, extend through the middle of the patch, and in so doing severed the peculiar stripe from the upper part, thus forming two patches. In a still further advanced stage, that of form E (Plate XIX, 8*e*), the darkening has covered the peculiar stripe, so that only the upper patch is left, and proceeding, the stage is reached in form F (Plate XIX, 8*f*) in which of the patch on the upperside there remains only a small relic, while, on the underside, where the same has been going on, but in a much less vigorous form, it has remained somewhat larger.

This forms a striking example of the perfect regularity with which the evolutionary process develops in individuals of this species. But there is more. I possess 6 specimens of form C, 30 of from D, and 11 of form E, all caught in Batavia indiscriminately in the dry and the rainy season, and these show very clearly that the same evolutionary process, although revealing itself in each individual according to the stage of evolution attained, always proceeds in the same manner; that the darkening therefore always takes place in the same way in the different generations. We might compare it to pupils, placed, according to their knowledge, in different classes of the same school, and using different books, all belonging to the same series; a school in which no pupil could pass to a higher class, but each new child, according to the account of knowledge already acquired in a preparatory school, would be immediately placed in the class to which it properly belonged. It is then, a regularity, penetrating to the smallest details, which characterises these evolutionary processes; it is absurd to try to explain it by such a phrase as "variability". We were therefore correct before, in supposing that various facts which we had encountered pointed to such regularity; similarly when, on p. IX of my third introduction I pointed out the course of the process of decay of the horn of the Sphingidae larvae, or on p. LIV of the same, the greater or smaller distinctness of the ocelli on the underside of the wings of CYLLO LEDA L.; every evolutionary change develops according to fixed rules. And in the example just given, development takes place quite gradually without any question whatever of sudden changes.

Working under similar conditions colour-evolution will bring about similar effects, as must be the case with every evolutionary process. This is why we find butterflies which resemble each other very closely in colour and shading while belonging to different species, and even different genera and families. Amongst

the Lycaenidae of Java this resemblance is very striking, for instance, between the ♀ of LYCAENA KERRIANA Dist. (Plate XXI, 49*a.b.*) and of LYCAENESTHES TESSELLATA Moore (Plate XXII, 88); it is stranger still to find the peculiar white lines above referred to which occur on the underside of many LYCAENAE recurring in DEUDORIX KESSUMA Horsf. (Pl. XXV, 126*a.b.*). This may be seen even in butterflies inhabiting quite different districts. I have pointed this out already on p. XVI of the introduction to my second monograph. For colour-evolution is the same in all butterflies all over the world, where, therefore, as occasionally happens, it proceeds under the same conditions in different places, it leads to the same results. The great variety of colouring displayed by Lycaenidae is also caused by this.

What we are able to observe about this process may give the impression of confusion, but in reality it is governed neither by accident nor caprice, but we must look for the explanation in a number of disturbing influences which work upon it, and which can be so numerous and drastic as to confuse, not the process itself, but our observations of the phenomena by which it is revealed. That is, in so far as these observations are not made in a thoroughly scientific manner.

In what way the impetus to any evolutionary process arises, is not known, in the case of colour-evolution no more than of any other, but we do know that this impetus leads to actual changes in very different ways; there must be susceptibility to reaction in the creature upon which it works, and it must possess a fitness for it.

Now the susceptibility to this influence and therefore to evolutionary change of colour is extremely different in different individuals; formerly when discussing the supposed seasonal varieties I showed this clearly enough. This evolution takes place much more rapidly in one individual than in another; where, as far as we can judge, the same conditions are present, some display evolutionary phenomena, while others remain quite unchanged. This explains the presence, in the same district and at the same time, of butterflies of the same species, which differ from one another in colour, according as this evolution is further or less far advanced.

Seeing that the susceptibility is so different even between individuals, it is not surprising that the sexes also should differ in this respect sometimes. As there is a physiological difference between both sexes, it appears to be probable that this may bring with it a differece in susceptibility; and furthermore, where the susceptibility exists, the changes brought about by evolution must also be influenced by the physical peculiarities of the individual upon which it works, and when the peculiarities in different species, or at any

rate in different genera, are not the same, it must accommodate itself constantly to these. A very clear instance of this I have quoted in the introduction to my third monograph, p. IX in the evolutionary process which causes the destruction of the so-called horn of the Sphingidae larvae. This horn usually takes a different form in the various genera, or shows a different stage of the process. In the same way in butterflies the specific or generic difference will include a difference in physical structure, although it may be too slight for us to observe, and this may be such as not to admit a progress of the colour evolution in the same way, but demand a special accomodation to a special physical structure. On p. XIII of the introduction to my first monograph I pointed this out, and quoted J. F. CUNNINGHAM'S opinion on the subject. In particular it is the structure of the wings which is of importance in this connection; as discussed on p. XLIX of the introduction to my third monograph, distinct ridges or indurations may, for instance, develop on the wings in one species, and not in another, and as persistent spots, may play an important part here.

Observation shows that these evolutionary processes do not as a rule proceed in the same way on the upper- and underside of the same butterfly. We have discussed this also in the passage referred to, showing that it must be due to a difference of structure of the two wing surfaces, which would influence the development of this evolution in the manner above referred to.

Observation further shows, that the rate of progress of colour evolution—and indeed of all evolutionary processes—is very unequal; even in the undoubtedly extremely ancient process by which the fore-legs of the Rhopalocera gradually disappear, the genus TARAKA does not seem to be in the same stage of development yet as the other Lycaenidae. It teaches us, moreover, that there are periods of complete stagnation, of *epistasis*, which may last for a very long time, and which may occur in one sex or species, while in another the process continues; this is another cause of great dissimilarities. I have already discussed this matter in my second introduction, (p. XVII). Finally, we have here to deal with two processes of colour change, that of fading, and that of darkening; processes which develop independently of each other and by no means simultaneously, and whereby the latter not frequently renders the effect of the former invisible, and then again in some cases, by disappearing more or less, brings the first once more to light. Moreover the phenomenon of structural colouring further increases the variety which the wealth of colour presents to us; the so far unexplained local influences which play such an important part in the Danaidae, have, however, never been observed in the Lycaenidae. There are obviously, factors enough which may account for the differences here under discussion. If we still further consider, that the number of species of Lynaenidae

is very large, it becomes evident, to what the great variety of colouring amongst these butterflies is due; and that casual or capricious, such as meteorological, influences can only play a very insignificant part in it.

In this way I believe that the origin, and at the same time the nature of the wealth of colour in the Lepidoptera, which is especially remarkable in the Lycaenidae, becomes intelligible. It is true that the application of my theory is not complete, in the first place because I have been obliged to confine myself to the Lycaenidae of a part of the Indo-Malayan fauna, and a similar treatment of this family over the whole world will greatly supplement and improve our knowledge of the subject, and further because more minute investigations, even in the confined circle in which I moved, may also do this to a considerable extent. But I have made at least an attempt to elucidate the subject by observations and conclusions drawn from them, that is upon scientific lines, instead of using the current phraseology. In my opinion, in the face of these, it is now impossible for a serious student of nature, who is not obsessed by conventions, not to acknowledge what I have maintained for years, that the variety in colour amongst the Lepidoptera is caused by evolutionary processes, which I have called those of colour evolution. Not that we can expect this to happen at once: superstition and error are not easily overcome upon any subject. My investigation of this subject has led to other most important conclusions. It has enabled me te see, that the evolutionary pressure towards change takes place in a manner which, I believe, was hitherto unknown, or at any rate very little generally understood, and the conclusion cannot be ignored, that this must also be the case with regard to all other evolutionary change.

My views apply to all manner of false prevalent theories, such as those concerning the nature of the so-called seasonal variations, those concerning the sexual significance of the difference in colour in so-called sexual dimorphism, and others. The phenomena in question demonstrate very clearly, what I have already pointed out in my first introduction (p. XI), that the preasure towards evolutionary change, does not, as is generally believed, act upon at whole organism of a particular species as such, but that only special organs or other physiological units in such a group are altered by it. At the same time, as this may take place with several such units simultaneously, or because these separate changes, through correlatine action, may stimulate a similar pressure in other such units, a change of such importance in a group of organisms may be brought forth. [1])

[1]) When the above was ready for press I noticed an article by HENRY FAIRFIELD OSBORN (*Columbia University*) in *Nature* of *Nov. 11th 1915* from which I give the following extract:

This is a point of view of the greatest possible significance, embracing even the development of man as a spiritual being. Contemporary biological science is practically indifferent to this: but new ideas on the subject must ultimately find acceptance, which will undoubtedly have a fundamental influence upon many biological theories and problems, at present in the order of the day. Naturally this will need time, but it is bound to come: "evolution" will cease to be a pedantic phrase, a commonplace of conventional would-be learning, and become the subject of serious study. This was the intention and the hope of the great minds that discovered it, however much the thick fog of narrowmindedness which descended upon it later may have prevented it.

We must still discuss another independent change of the kind referred to of particular organs, that, namely, of the evolutionary change in the genitals. In the study of the Lycaenidae very free use has been made of this for the distinguishing of species, by Mrs. F. A. CHAPMAN, J. W. TUTT, and GEORGE T. BETHUNE-BAKER, the last in his „*A Revision of the Amblypodia Group of Butterflies of the family Lycaenidae*" *(Trans. of Zool. Soc. London XVII 1903)*, so that SWINHOE too considers that the systematic arrangement of the species must be formed upon this basis. A short time ago the Dutch entomologist mentioned on p. LXIV of my third introduction, has treated the Rhopalocera fauna of the island of Si Malur according to this system *(Notes of the Leyden Museum Vol. XXXVI)*, and he has also verbally communicated to me some other results arrived at in the same way; it is therefore high time to pronounce a warning against this method. Undoubtedly in many species there are characteristic differences in the structure of the genitals, which may therefore legitimately be used to distinguish these species. Nevertheless it is superficial to regard these as a infaillible specific characteristic. It is not only incorrect, but entirely unscientific.

This subject is still haunted by the old conception, referred to above, which regarded the different species as so many independently created entities. But since the discovery of evolution has dissipated the idea of reparate creations, and since it is known, that species arise from others through differentiation,

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"Palaeontology has now proved that every organism is made up of an almost infinite number "of characters, each of which is in a continuous state of movement.... The most significant "result derived from the intensive study of the evolution of the titanothere family of mammals "is the law of multiple character evolution, namely, that evolution simultaneously progresses in "every one of the innumerable single characters of which an organism in composed."

It is certainly remarkable that my studies on living insects entirely conform what the writer has discovered through his palaeontologial studies and how we have both been brought to a recognition of the importance of the multiple character of evolution. For although this is not entirely unknown, yet it is indeniably neglected by present day science and the importance of it is by no means sufficiently appreciated.

the conception of species has ceased to express a natural phenomenon; in contemporary science it has only a systematic meaning. Now it is obviously unscientific to try to find natural characteristics for something that is not a natural phenomenon. The development of new forms out of already existing ones, is a phenomenon of evolutionary change; to be able to answer the question of whether a new form shall be acknowledged as a new species, systematically, it is essential to know how far this change has proceeded, and in order to be able to judge of this, it is necessary to be familiar with the nature of the evolutionary process and the way in which it acts. This demands scientific study; theories about the specific characteristic which are not based upon this study, are fantastic, not scientific. It is, once for all, impossible to learn to read without first taking the trouble to learn your letters and even to spell.

It is true, that when a species is so far differentiated, that it is conspicuously unlike all others, this difference can usually be traced in the construction of its internal organs, in which case it can be used as distinguishing characteristic. But when the differentiation has not yet become so marked, experience shows that it proceeds very unevenly with regard to all the external organs. Thus, although in some respects important differences from the original species may have developed, all the rest may have remained the same. And seeing that this irregularity in the rate of progress is characteristic of every evolutionary process, it is not easy to believe, that the internal organs should form an exception. So that, where with regard to these a considerable differentiation from the original species may have taken place in some respects, it does not necessarily follow, that it will be so with all the organs; some may have remained the same as in the original species; while in other cases it will be just these organs that have the first entered upon differentiation. Therefore the systematic arrangement of species cannot be based upon this. This fact is incomprehensible to those who entertain a one-sided prejudiced point of view and are ignorant of the fact, that the organisms are subject to an evolutionary change which at certain periods is very active in some species. This is the reason why, when research showed, that the ancient form Hilaria Cram did not coincide with the common form of Callidryas Pomona F. as regards the genitals, and that the genitals of the old form Blanda Bsd. are not the same as those of the common kind Terias Hecabe L., it was erroneously concluded that Hilaria Cram and Blanda Bsd. must be separate species, although breeding had demonstrated the contrary. Of the first form there only exist ♂, as a matter of fact, similarly as in the old ♀ forms Achates L. of Papilio Memnon L. and Zithenius Herbst of Cyllo Leda L. there are only ♀. It is the same with the genitals of the Lycaenidae. These are also subject to evolutionary change, and as it would

seen, are indeed highly susceptible to it, whereby, immediately a species begins to differentiate, the organs usually also speedily begin to change. But where, then, is the boundary between the old species and the new? This can only be fixed, when the change has gone further, and as the differentiation of the genitals goes on independently and therefore does not necessarily keep pace with that of the other organs, it is quite possible, that in two forms, which in other respects have come to differ so much from eachother that they must obviously be regarded as different species, the genitals may be still unchanged, and thus be the same in both forms. The evolutionary character of these changes in the genitals has been very clearly shown by the latest researches. Of a series of Pieridae to which the PIERIS JUDITH F. of Java belongs, closely related forms are found in various other districts of the Indo-Malayan fauna, forms, which, differing sufficiently in colour and markings to be systematically divisible into different species, are yet mutually closely related, and form, as it were, a series of species flowing into one another, apparently all differentiated out of the same original stock. The research in question showed, that in all these forms the genitals differ from one another, but so slightly and in such a way, that these organs also show exactly the same gradual transition, and thereby demonstrate, that they too have come, through evolution, from the same original stock form. But does this justify us in forcing the systematist to ackwowledge them as all belonging to one species? How would it have been, if only the most differentiated forms had been preserved? It is one-sided to attach so great a systematic importance to a single organ. We have to recognize the fact, that it is not the animal as such but every organ, each physiological unit, which develops evolutionary changes, independently, sometimes but not always simultaneously with the others and in connection with them.

It was with great satisfaction that I saw, that an opinion in support of mine had been expressed by an authority a short time ago. In the *Entomologische Rundschau* for June 1915 there is a short review by Dr. AD. SEITZ, in which he says that, although the genitals of the Lepidoptera are certainly useful in recognizing the different species, it is an error to expect to find rigid specific characteristics in them, and even to attach more value to them than to what can be learned in this respect from the study of the primal conditions, which alone can give certainty on the subject. He quotes as an example that the excessive difference in the form of the male genitals in the American Erycinidae makes them absolutely useless for the above purpose, and that, if such differences were really of specific significance, PAPILIO XUTHUS for instance would be a different species to PAPILIO XUTHULUS, which is really nothing but a springtime generation of the first. What he here calls,—in accordance with

the usual ignorance of evolutionary change,—the springtime generation, is nothing but a less far advanced evolutionary stage of the same species, that is, therefore, exactly the same as is found in the above mentioned forms of CALLIDRYAS HILARIA Cram. and TERIAS BLANDA Bsd.

I must now, although it may lead to some repetition, return to the mutation theory, so popular at present, but which I have already said I do not agree with. According to the old school, a species was usually taken to be a form of life created by a higher power, independent and immutable, always reproducing itself in the same way. There were also some who thought that only the larger groups, the genera, had been created, and that from these, by what was called the natural way, but what in reality was a mysterious incomprehensible process, such as splitting, other kinds were formed which became the species, and from which again in the same way so-called varieties were produced, suddenly bij abrupt changes. DARWIN, on the other hand, believed that all animal and vegetable forms have developed by a natural process from other forms, but always in a gradual way. Recently the so-called theory of mutation has arisen, which maintains that each species is immutable in itself, but that sometimes a new form suddenly develops itself from it, which in its turn continues as an independant and immutable species. In this way it accounts for the origin of species, discording DARWIN's gradual change of existing forms. But notwithstanding that the name of my compatriot, the learned botanist Prof. HUGO DE VRIES in connected with this theory, I am still unable to support it. It is, in my opinion, nothing but a reactionary endeavour to fit the old idea of species, still lingering as a relic, to the new doctrine. By his experimental studies Prof. DE VRIES considers that he can support it; my studies which, it is true cannot be called so purely experimental, but which are based more upon many and accurate observations, and upon the logical working out of the results thus obtained, force me to a different conclusion. I may say at once that the whole idea appears to me to be intimately related to the ancient doctrine of original creations, for the so-called elementary species are really nothing else. This doctrine does not necessarily imply only one single original creation, it allows a continual activity of the same creative power. Neither does it only refer to the calling into being of something out of nothing, the biblical legend of the creation of woman out of the rib of ADAM proves the contrary. That which characterises what we mean by creation, is its sudden appearance, and the inexplicability upon natural grounds of the reason for its origin and of the manner in wich it arises. In what way, then, do mutations differ from this? Moreover the study of such evolutionary processes as govern the destruction of special organs—that of the disappearance of the horn of the Sphingidae larvae mentioned above

shows this most clearly—shows that they continue during very long periods very gradually, and so cause a considerable change in the form of the animal species in which they occur.

The form, for instance, of a hornless Sphingidae-caterpillar like DEILEPHILA VESPERTILIO F. differs so markedly from its original stock which existed perhaps many thousand years ago, and was provided with a long, mobile tail horn possibly covered with long poisonous prickles, that it would certainly be taken as a specific distinction, if it were found at the same time, and in a complete insect, not a caterpillar. And it is possible for several of these processes to be developing simultaneously in the same species; this is the case in the Rhopalocera, with the diminishing of the wings, the atrophication of the fore-legs and the colour-evolution; their combined influence can greatly change an animal form in the course of time. Seeing that there is no doubt, that these evolutionary changes are brought about very gradually, is it probable that other changes of the same nature should take place quite suddenly? Is it conceivable, that the nature of this great natural phenomenon Evolution—for that is the point in question—could be of such a different nature? I mean, of course, in reality; for it is certainly possible, that it may appear so to our imperfect observation; but this is not the sense in which it is meant by the theory we are discussing. In all my many observations of evolutionary change, I have never seen it happen suddenly. It is true that the moment at which it begins in a particular individual is to some extent sudden, but neither is this what is meant by the theory; when the same process of change is seen to arise in different individuals, in the one earlier and more markedly than in the other, and then to extend in the same unequal manner, it is a clear demonstration of the gradual development of one same process. And it is always of such process that these changes in form are the expression. The few examples of mutation observed in animals that I have seen mentioned in different works, have always given me the impression of being based upon very superficial and doubtful observations; I never found the least attempt to explain these observations in any other way and I can attach no value to them. As regards the really accurate investigation by E. I. BOUVIER of the changes observed in Crustacea, it refers to a process of change of form in a group of crustacea of precisely the same nature as that which I have made a study of in the Rhopalocera, and this entomologist quite rightly recognises it as due to evolutionary changes, and calls them "*mutations évolutives*". But not understanding the true nature of them, he sees, in the great variety of ways in which the process develops in different individuals, not the gradual course of the process, but so many sudden mutations. This is not the interpretation given by the mutation theory however; the formation

of each new cell and every change which it causes, certainly takes place suddenly, but what the theory means is the spontaneous appearance of changed forms, not as the expression of a process of development. On the other hand, a few days ago I read an article in the *North American Review* of Sept. 1914, entitled '*The Evolution of the chin*' in which DR. LOUIS ROBERTSON carefully follows the evolution of this part of the human body, and shows how in connection with the development of articulate speech, it has gradually, not suddenly, developed. I am well acquainted with apparent mutations. The full grown larva of PAPILIO MEMNON L. is strikingly different in shape from the form it bears before its final shedding of the skin; the new form in this case appears suddenly. But the different forms of the caterpillar are only the repetition, in accordance with the so-called biological law of HAECKEL, of its previous forms, which must originally have come about gradually, but which now, in a still quite unexplained manner, are concentrated in the periods divided by each shedding of the skin and after each moulting appear as a sudden change. This suddenness is, however, only apparent, the process of which it is an expression is by no means clear to us, but for all that it exists indubitably. As a matter of fact the last shape of this caterpillar is not an isolated form entirely disconnected with its earlier ones; this is shown clearly by the larvae of related species, which have gone through the same process of change, but not so completely, retaining therefore in various respects a resemblance to the older forms, which has completely disappeared in the PAPILIO MEMNON L. caterpillar. Is it not possible, that in the field of Botany there may be obscure processes which cause what seem to be sudden mutations, although in reality this is a false appearance? My observations have led me to the conviction, that each organ, or rather each physiological unit, can become subject to a pressure towards spontaneous changes, for the development of which in the individual a special succeptibility—the conditon called in the mutation theory a "mutation period"—is necessary; which susceptibility does not arise however at the same time and in the same degree in every individual; the consequence of which may be, that between the individuals of one species in whom the susceptibility is present and those in which it is absent, a division may arise, whereby a new species comes into existence. Where a susceptibility of this kind has arisen, it may also appear in other physiological units; or correlation may cause this and when by these means a further impulse towards change has become active, naturally the separation may assume greater proportions. These processes develop very differently according to the greater or less susceptibility of the individual and the period of its development, and therefore proceed with greater or less rapidity. The true nature of this susceptibility is not known; some of

my observations lead me to suppose that it is sometimes occasioned by a change of food in some individuals, in which case it may be considered as a physiological change in an individual which renders it sensitive to influences which formerly had no hold upon it. In the same way through a change of this sort we may see a susceptibility to certain diseases arise in a person who was formerly immune. Such an influence might cause an impetus towards a special evolution. The idea has also occurred to me, that this may be the reason, why the sudden changes have been found so especially in agriculture and horticulture; that is to say where a particular form of culture effects the peculiar constitution of a species to such an extent that, as suggested above, a susceptibility to change arises.

The nature of that which we call life, is a mystery to us; the efforts to explain the origin of it upon chemico-physical lines as developed out of inorganic matter, are, in my opinion, a failure. Life is something that for us is invisible and intangible, broadly speaking therefore immaterial; we only perceive its manifestations as the spiritual element governing the material element, which also sustains the existence of the simplest cell, causes it to increase, and exercises a certain pressure upon it towards development, leading to the formation of specialized groups of cells. I regard this as a psychic element; and therefore only perceptible in its outward expression. Now there is no difference that can be demonstrated between the physical development of man and that of animals, down to the very simplest forms, except of a quantitative kind. Why should this be otherwise in regard to the spiritual development? Here also, we find it amongst contemporary man, and man during the long period since he first came into existence, as also in the different kinds of animals, although unequally developed, yet only a quantitative difference. Why, then, should this spiritual element not be present in the simplest living substance although in such an elementary form, that we can hardly imagine it, and thus exercise control over matter? Life becomes then in truth, in accordance with the oldest conception of it, the inspiration of matter, although we need not take this inspiration in the mystic sense, and this psychic principle element may also be regarded as matter, but of a finer sort, not perceptible by our senses.

Just as this vital principle from the very beginning has exercised pressure in the direction of every physical change, every specialisation of cells, so it continues through the higher physical development; whenever the psychic element judges a change in the organism to be necessary, it exercises pressure towards change, towards evolution in a definite direction, the one desired. In this manner that whole wonderful machine which forms the animal body, must have been formed; that the development of this should not have been guided by a thinking psychic

element always moving it in the desired direction, is inconceivable to our understanding, it rests, where it is accepted, upon hollow uncomprehended assumptions, in their nature really not differing from mysticism. And what I have learned from observation concerning the gradual development of an evolutionary change, proceeding in a certain direction and confined to a special physiological unit, is quite in accordance with the acceptance of a psychic element.

If, in this way, especially when more than one such changes take place simultaneously, a considerable change of form is brought about, there is ground, as they reproduce themselves independently, for assuming, systematically, a separate species, and in that case the difference in certain organs which has arisen in this way, may be taken as a systematic distinguishing characteristic of the new species, but it by no means follows, that merely some difference in a single organ in a number of individuals of one species can constitute such a distinction between them, as to justify the systematic assumption of a separate species. This might be called putting the cart before the horse. It is equally unnecessary for the recognition of a new species, that all the physiological units or organs of the original stock should be altered. Even when this has only taken place in some, the general change of form may be sufficient, and it may be just those organs that remain unchanged where change in the above case was taken as a systematic characteristic of a new species. For species is merely a systematic form of division, not a natural one; natural specific characteristics as such, cannot exist. I am therefore unable to regard as successful the endeavour of the doctrine of mutation to rehabilitate species as a natural division. There is, however such a wide difference between the development of plants and of animals, that it is quite possible, that observations made in the one or the other field, may lead in quite different conclusions. But such a general biological law as the doctrine of mutation must be true for the animal world as well as that of plants, if it is to be accepted.

The peculiarity, named variability, which is applied to elucidate the mutation theory, does not exist; it is merely a fiction, invented, as it were, to personify the enigmatical fact by giving it a name, and turning it into an inherent property. In my opinion it should be relegated to the scientific waste-paper-basket, along with the theory of mimicry, of natural and sexual selection and many more such. And the so-called laws of QUÉTELET and his followers regulating this fiction should go with them. It always astonishes me, not to see the mutation theory used to defend the theory of mimicry. There the gradual development of the protective qualities, according to the Darwinian theory, is very improbable; they would then, in the beginning of the development, have been so slight, that they could not have afforded any protection, and so there

would have been no reason, why these peculiarities should be retained by their descendents. The assumption of sudden changes would remove this difficulty at once; but how would this explain the sudden resemblance? However, so many discoveries have been made in this field, that a few more might easily be added!

There is one biological phenomenon that is particularly prominent in the Lycaenidae; unfortunately it is only since I left Java, that attention has been drawn to it, so that, being ignorant of it, I have not made any observation upon it. I refer to the symbiosis, which occurs in this family in so many forms, that it can hardly be attributed to one origin, which makes the explanation of it very difficult. It is now known, that the larvae of many Lycaenidae are provided with glands which secrete a sweet liquid, in the same way as the Aphididae, and, also as in the case of the Aphididae, that this is collected by ants, who use them as milch-cows, stroking them with their antennae, to encourage the secretion. There are many publications on the subject, including such as maintain, that in return for this service the ants protected the larvae against their enemies, and that they drive them to their nests to breed them. Not long ago I read an article about one of the Lycaenidae-caterpillar in East Africa, that is supposed to live inside a Cecidion and be fed there with pieces of leaves by the ants. They are also supposed to take care of the pupae, and to obtain tissues for their nests make use of the larvae as spools, an account of their spinning capacities. It is doubtful whether a good deal of fancy and auto-suggestion are not conducive to such observations; at least experience teaches us to be cautious in accepting them. Nevertheless the fact of symbiosis is indubitable. I have not, as I say, observed it myself. Although I had noticed in my garden in Batavia, that the numerous larvae of Lycaena Pandava Horsf. that I found there on a species of Cycas, were always surrounded by a swarm of ants. I was surprised to find that they apparently did them no harm, and being at that time still obsessed by the theory of mimicry, I imagined, that they must be protected by some sort of mimicry and tried to discover the nature of this. Naturally this was attended with no result, except the negative one that, concentrating all my attention upon this point, I failed to grasp the real nature of this symbiosis.

Subsequently Edw. Jacobson, being acquainted with the phenomenon, observed it with the Javanese Hypolycaena Erylus Gdt. and the ant Oecophylla Smaragdina, publishing his results in part LV of the *Tijdschrift voor*

Entomologie (1912). He also observed, that the larvae were made use of by the ants as weaving-spools. This will undoubtedly be the case with various other species of Lycaenidae in Java. According to an article in the *Deutsche Entomologische National-Bibliothek* of Sept. 15th 1910 this subject has been dealt with by H. VIEHMEYER in *The Philippine Journal of Science V, No. I. Section D.* pp. 69—72 and 73—77, where he enumerates a number of Austro-Malayan larvae, of which the following are also found in Java: — MILETUS SYMETHUS Cram, LYCAENAE PUSPA Horsf., UBALDUS Cram., CELENO Cram., PANDAVA Horsf., CNEJUS F., BOETICUS L., LYCAENESTHES BENGALENSIS Moore, LIPHYRA BRASSOLIS Westw., APHNAEUS VULCANUS F., and DEUDORIX ORSEIS Hew. I have found a good many of these in Java, but, with one exception, I never noticed ants in their neighbourhood. It is of course quite possible that, with the same species, the circumstances might be different in another place to what they are in Java, for instance the particular species of ants might not occur in Java. In the above mentioned journal H. VIEHMEYER is also said to have described and illustrated the chrysalis of an ARHOPALA species, which was found in great quantities in the earthnest of the ant CAMPONOTUS QUADRISECTUS Smith. and which secrete a sweet fluid just in the same part of the body as the myrmicophile larvae.

A short time ago, a very remarkable thing was observed in connection with this. Colonel H. I. W. BARROW, in British India saw the butterfly ALLOTINUS HORSFIELDI Moore, one very common in Java also, refreshing itself with the sweet fluid of one of the Aphididae, just as the ants do, while it stroked the insect with its long fore-legs, as the ants do with their antennae. An illustration of this curious fact is found in the *Fauna of Brit. India Butt. II* edited by BINGHAM, from which it is seen, that the Lycaenidae do not only fulfil the passive rôle of the Aphididae towards the ants, but, like the ants, take an active part with regard to these insects. In connection with this it is interesting to note, that in the various ALLOTINUS species, as with all GERYDINAE, with certain modifications, the fore-legs are formed in a particular way, which will certainly make them peculiarly suitable for this stroking process and this raises the question of whether all the GERYDINAE have this habit, and if the transformation of their fore-legs should be regarded as an adoptation for this purpose.

Thus we see that the Lycaenidae present a case of a passive symbiosis with the ants, and an active one with the Aphididae, both of a friendly nature. But they also act antagonistically towards the ants and towards the Aphididae. The gigantic species LIPHYRA BRASSOLIS Westw. which inhabits British India and many islands of the East Indian Archipelago and Australia, is found, though

rarely, also in Java. The habits of this species in Queenslands (Australia) are fully described by T. F. Dodd in *The Entomologist* June and July 1902; it seems that the larvae, and also the pupae, live in the nests of the ant-species Oecophylla Smaragdina F. found also in Java, and that the former feeds upon the larvae of the ant, while caterpillar, pupae and butterfly are protected by sticky threads and other means of defense, against attacks from the ants. Further, I have reason to believe that the larvae of various Gerydinae species feed upon Aphididae. Such larvae were repeatedly brought to me as having been found upon the leaves of certain plants, but which I could never induce to eat these leaves. This leads me to suppose, that these larvae do not live upon vegetable food, but upon Aphididae, and all the more, because I found that these caterpillars, when kept together in one box, devoured eachother, a cannibalism, which points rather to carnivorous habits than to those of vegetarian diet. Cannibalism is not unknown amongst Lycaenidae larvae; Swinhoe tells of it for instance in Iraota Timoleon Stoll, and on the authority of other naturalists, in Spalgis Epius Westw. and Zephyrus Quercus L. In the Lycaenidae-larvae observed by me, the tendency exhibited itself especially when one of them in passing into the chrysalis stage had stripped off the caterpillar skin, so that it was in a very soft condition; in this state it was attacked by other caterpillars and eaten up. Others, as quoted by Swinhoe have observed the same thing. An observation made by Dr. Chr. Schröder forms an interesting parallel to this; he noticed exactly the same thing in the breeding of the larvae of Coccinellidae, these Coleoptera also feeding principally upon Aphididae. Concerning this symbiosis of Lycaenidae with ants in Java many and accurate observations are very desirable; what we know about it is still very incomplete.

For the rest there is not much to say about the larvae of Lycaenidae beyond what is found in other works. I will not again enter upon the supposed seasonal varieties. In the introductions to my earlier monographs I fully explained, that I cannot accept such forms, as regards Java. In the dry as well as in the rainy season, individuals are found more or less advanced in the evolutionary process to which they are subjected; the most that can be said is, that the former are somewhat more numerous in the rainy reason. I only wish to recall to memory a few facts which I have observed and already published elsewhere. I once found some larvae of a Lycaena species presumably Lycaena Cnejus F. inside the pods of a wild plant. These larvae, living thus shut off from the day-light, were very faint in colour; in one the *vas dorsalis* showed dark through the skin, seeming to form a dorsal line; the skin itself was however not marked, but in another there was actually a darker dorsal stripe, just above the *vas orsalis*. This would lead us to suppose,

that on this dark background provided by the *vas dorsalis* the dark pigment had first formed.

As some Lycaenidae-larvae live in the seed-pods of leguminous plants, so a few live inside the fruit. Thus I found in Java the larva of DEUDORIX EPIARBAS Moore in the fruit of the *ramboutan* (NEPHELIUM LAPPACEUM). This larva did not at all look like a Lycaenidae-caterpillar, but very much resembled a Heterocerum determined by SNELLEN as LEOCYMA BATEOIDES S. i. L. which is common in the fruit of the *dourèn* (DURIO ZIBETHINUS L.) and shown by me on p. 4 fig. 11, of the *Tijdschrift voor Entomologie XI.* It was claret-coloured, like this, and therefore did not correspond to the picture given by SWINHOE of this caterpillar and chrysalis; neither did my caterpillar pupate within the fruit, but outside, against the fruit that lay upon some earth or perhaps against a lump of earth; I could not observe this quite accurately.

A few words may also be devoted to the physical form of the Lycaenidae-larvae. In many of them it is what has been called onisciform, more or less resembling Oniscidea, but in others, as the larva of DEUDORIX and JOLAUS species it differs very widely from this. And SWINHOE gives illustrations of other larvae of still different forms; but his illustrations are so defective as a rule that it is difficult to judge of them. The strangest one that I found in Java, seemed to me to be that of DEUDORIX SPHINX F.; (Pl. XXV, 129*cd*). I do not know if there are similar ones to be found amongst Lycaenidae living elsewhere. Of this species I can give a very good drawing. It shows on each joint a bunch of spikes sticking out on both sides, the same, in a less developed condition, as are found in the Cocliopodae-larvae THOSEA LOESA Moore and CANEA BILENEA Moore, an illustration of which I have given in part XLIII of the *Tijdschrift voor Entomologie* plate 2, nos. 1, 2 and 7. This caterpillar, therefore, resembles the Cocliopodae-larvae. It appears that in the evolutionary changing of several parts of the body, including such appendages also, casual circumstances may guide the process in a particular direction, and that when the circumstances are the same, however much the animals may otherwise differ, they may lead to the occurrence to a certain extent of the same morphological forms. Such lateral prickles are found for instance very much developed amongst the Nymphalidae-larvae of the genus ADOLIAS, and some related genera, but only in these genera, although the development of these thorny appendages in them is apparently the same as in many other Nymphalidae-genera in which however they take all manner of other forms, not lateral.

As regards the pupae of the Lycaenidae I must discard the idea that some of them produce sounds, as has lately been stated again in articles in

the *Biologisches Centralblatt* of Aug. 20th 1913 and in *Nature* Nov. 21st of the same year. As early as 1896 in part XXXIX of the *Nederlandsche Tijdschrift voor Entomologie* Dr. OUDEMANS asserted that he had observed the same thing in the chrysalis of ACHERONTIA ATROPOS L. I have bred the very common ACHERONTIA LACHESIS F. of Java in great numbers there, without however, ever hearing any sound. It certainly did draw my attention, that on the pupae of this species of Fleterocera there were shragreened stripes of the same sort as belong to the stridulation organs of other insects. Similarly some insects are seen to go through rubbing movements, just the same as those which in other kinds produce a sound, but without any sound being heard. This is probably due to the limitations of human hearing, which is unable to perceive the sound produced by some insects. Is it possible that the stripes on the pupae of ACHERONTIA LACHESIS F. present a similar case? The rubbing together of the secondaries by some Lycaenidae referred to on p. VI may point to the same thing, although no organs can be discerned which give any ground for this supposition. What I certainly have observed is the fact quoted by several writers that, although most pupae of the Lycaenidae belong to the succincti, there are some which are only fastened to the cremaster, in a hanging or lying position without a girdle thread.

In certain species such as JOLAUS LONGINUS F. (Pl. XXVI, 148*d*) in which the pupa bends away some distance from the twig or leaf to which it is attached, this is certainly the case, but it is more doubtful, whether in other pupae of more usual form and which hang in the ordinary way along twigs and leaves, the girdle thread is perhaps also absent. In that of AMBLYPODIA NARADA Horsf. I could not discover one even after careful search; this pupa is certainly of a particularly massive form, but JACOBSON notes the same of the pupa of the very ordinary form of HYPOLYCAENA ETOLUS F. of which he gives an illustration. Seeing that there is no doubt that it is absent in the first-named species it may be assumed that amongst the Lycaenidae the evolutionary process, discussed in my second introduction, which causes the succincti to change into suspensi, is working in these species; it is therefore by no means improbable, that the same process is going on in other Lycaenidae, and considering the extremely unequal-rate of progress peculiar to all evolutionaty processes, which we have frequently insisted upon, that this is only the case in a few species. But it is of importance, that accurate observations may be made on this point; it would form another very clear example of the way in which such evolutionary processes develop, and of the great inequality which governs them. This must be done, however, with great caution; I therefore consider it desirable to make the following remarks upon the subject.

The same phenomenon occurs in the Erycinidae. I have already told how, ten years ago, my article "*Ueber die sogenannte Schwänze der Lepidoptera*," was the occasion for an attack, equally stupid and conceited, by a German systematist, which displayed in the most blatant manner the total incapacity to which I have often referred, of comprehending the meaning of evolution. On that occasion it appeared that this individual was annoyed with me amongst other things because I denied his assertion, that the pupae of the American Erycinidae-genus STALACHTIS, were fastened without a girdle thread, merely as suspensi. He had taken this from W. W. BAIES, who it now appeared had not observed it himself. And what did I discover through further investigation? The pupa of one species of this genus is reproduced in the old work of SEPP, *Surinaamsche Insekten* without a girdle thread, but in the French and Dutch text belonging to it, it is distinctly stated that it is attached by a girdle thread. Moreover, in looking up the original drawing, still extant in the library of the Ned. Ent. Vereeniging, I found that the girdle thread was there represented! It had therefore been omitted in the colouring of the plates in the above mentioned work; presumably owing to the difficulty of reproducing it with sufficient fineness. Thus the erroneous picture had become a scientific fact; the French and Dutch text was problaby not consulted by those who could not understand it. In this way we see how errors may arise, and that therefore accurate observations are necessary. Another fact is the following. When I had caught a caterpillar of the Javanese Erycinida ZEMEROS FLEGYAS Cram. for the first time, it turned into a pupa upon a leaf, the chrysalis, as it seemed to me, being attached only to the cremaster, not by a girdle thread, which at the time surprised me very much. Subsequently I obtained more of these pupae, and observed that they did possess a girdle thread, although a very thin one. How did this happen? Did I make a mistake the first time? That is not very likely, I had good eyes then, and was in the habit of observing Lycaenidae-pupae; the absence of the thread surprised me very much at the time. Or is the girdle thread present in some individuals, while it has disappeared in others? Does the fact that in the former case it is so very fine, indicate that it is to be considered as a phase in the process of disappearance? This is quite possible, and if so, it would be yet another striking example of the gradual and uneven character of evolutionary changes.

I must now point out a few inaccuracies which have crept into my last monograph. On p. 51, there are named, and on *Plate XVI fig. 36ab* a drawing is given of two specimens of YPTHIMA ARGILLOSA Sn. This species must be cancelled. FRUHSTORFER drew my attention to the fact that these drawings

represented the species YPTHIMA JARBA de Nicév. mentioned by me on p. 49. This is correct. As I have mentioned in the introduction, p. LVII the species Y. JARBA de Nicév. was formerly unknown to SNELLEN and me. SNELLEN determined the specimens as Y. ARGILLOSA Sn., and as I followed his work as far as system is concerned, I adopted this in my text. The drawings referred to, which SNELLEN had prepared, had therefore this name attached to them. Only later, as stated on page 49, did I become acquainted with Y. JARBA de Nicév. and introduced it then into the text; but omitted to compare the specimens of this species with those of Y. ARGILLOSA Sn. and thereby to discard the latter.

The above mentioned Dutch Entomologist told me that in a study of the genitals of DANAIS LIMNIACE Cram. he had found them to differ so greatly in the forms MELISSA Cram. and SEPTENTRIONIS Dist., that these two forms must be regarded as separate species. The possibility of this I noted on p. 30 and 31 of the same introduction, but it is a too partial view, as explained before, to regard the question as settled by this research. Certainly the fact of this difference will be of importance in deciding the question, but it is not conclusive. How about the transitional stages occurring in Java, as described by me and the related forms outside Java, accepted as species by MARTIN and FRUHSTORFER?

IDEOPSIS GAURA Horsf. and F. DAOS Btd. according to the same Entomologist do not differ as regards their genitals, and would therefore belong to the same species. But the systematic conception of species does not depend upon the absence or presence of a difference in a particular organ.

M. C. PIEPERS.

ERYCINIDAE.

Butterflies of this family, (Lemoniidae Kirby, Riodinidae, Grote, Nemeobidae, Bingham) with one exception, are rare in Java, and as they do not occur in the districts where I have lived, I have only been able to study their habits in a few cases, and this only in the more common species.

On the authority of BATES it is generally accepted as a fact that the pupae of the Erycinidae belong partly to the *suspensae* of BOISDUVAL, partly to the *succinctae*. In particular those of the American genera EMENIS and STALACHTIS are supposed to hang by the end, free, without any girdle-thread. I doubt the accuracy of this as regards the pupa of a Surinam STALACHTIS species, described by SEPP, 200 years ago, in his work on "*Surinaamsche insecten*" (*III, table* 183). He states distinctly that it is attached by means of a girdle-thread; unfortunately this cannot be seen in his illustration, although in the original drawing, which I was enabled to consult, it is actually represented. The first time that I saw the pupa of ZEMEROS FLEGYAS Cram. I also thought that there was no girdle-thread; subsequently I discovered that there is a thread, but that it is so extremely delicate, that it may easily be overlooked. This may be the case with other pupae of Erycinidae, so that the girdle-threads of the species referred to above, may have escaped BATES.

Genus DODONA HEW.

1. APONATA Semp. (Plate XIX, 1*a*, *b*).

SEMPER,	*Schmett, d. Phil. I, p.* 156*a*, *fig.* (♀) (1886—92)	Dodona	Aponata.
FRUHSTORFER,	*Ent. Nachrichten*, 20, *S.* 22 (1894). . .	„	Windu.
„	*Berl. Ent. Zeitsch.* 39, *S.* 241, *Taf.* 22 (1894)	„	„
„	(SEITZ, *Groszschm. d. Erde*), *S.* 777, *plate* 139 ♀ (1914)	„	„
„	(SEITZ, *Groszschm. d. Erde*), *S.* 776, *pl.* 140 ♂ (1914)	„	Chrysapha.

SNELLEN considered that the Javan species, of which FRUHSTORFER only knew the female, should be united with APONATA Semp.

Subsequently SIJTHOFF caught a male together with the female, and on investigation this male appeared to me to be identical with the new species CHRYSAPHA, described by FRUHSTORFER on the strenght of one single male, the illustration of which on pl. 140 of the work by SEITZ is not very accurate.

W. Java. Prayangan mountains (1500) (SIJTHOFF); ibid. (1750) (VAN DER WEELE); Gedeh mountains (FRUHSTORFER).

C. J.?

E. J.?

2. FRUHSTORFERI Röb. (Pl. XIX, 2*a*, *b*).

RÖBER, *Ent. Nachr.* 23, *S.* 5 (1897)	Dodona	Fruhstorferi.
FRUHSTORFER, *Berl. Ent. Zeitschrift* 41, *S.* 398, *Taf.* 9, *fig.* 9 (1897)	„	„
„ (SEITZ, *Groszschm. der Erde*), *p.* 778, *pl.* 139 (1914)	„	„

FRUHSTORFER discovered this species, in both sexes, on the Gedeh mountains in West Java, and the accompanying illustrations are made from his specimens. This species is very closely related to the former, but the ground colour of the upperside in both sexes is white, while in APONATA this is only the case with the female. Between these two species, therefore, there is a difference in the advance of the colour evolution, corresponding to that which occurs in the CYRESTIS species C. LUTEA Zinck. and C. NIVEA Zinck. in Java.

Genus ZEMEROS Bsd.

1. FLEGYAS Cram. (Pl. XIX, 3*a*, *b*).

CRAMER, *III*, *p.* 158, *pl.* 280, *E. F.* (1782)	Papilio	Flegyas.
WESTWOOD, *Gen. D. L.*, *p.* 419, *pl.* 69, *fig.* 5 (1850).	Zemeros	„
BUTLER, *Trans, Linn. Soc. London, Ser.* 2, *p.* 545, *pl.* 69, *fig.* 10 (1877)	„	Albipunctata.
DISTANT, *Rhop. Mal.*, *p.* 187, *Tab.* 18, *fig.* 12 (1882—86)	„	Flegyas.
STAUDINGER, *Exot. Schm.*, *S.* 238, *Taf.* 87 (1886—88)	„	„
FRUHSTORFER, *Berl. Ent. Zeitschrift* 41, *S.* 332 (1897)	„	Sparsus.
MOORE, *Lep. Ind. V*, *p.* 96, *pl.* 405, *fig.* 1, 1*a*—*g* (1902)	„	Flegyas.
„ „ „ „ „ 99, „ „ „ „ „ „	„	Javana.

BINGHAM, *Fauna of Brit. India* I, *p.* 499 (1905). . . . Zemeros Flegyas.
FRUHSTORFER (SEITZ, *Groszschm. der Erde*), *S.* 772 (1914). „ „

W. J. Soukamantri (525); Salak mountains (780); mount Megamendoung (1500); Prayangan mountains (± 500); Nousa Kambangan (JACOBSON).

C. J. Province of Tegal; province of Madioun.

E. J. Willis mountains; near the lake of Klakah (230) in the province of Probolingo; mount Semarou (700); Tengger mountains (1200) (JACOBSON).

This species is common in the mountains, and is also found by the Klakah lake, and on Nousa Kambangan on the south coast. FRUHSTORFER says that they are found from the shore upwards; this can only be the case in the more mountanous southerly regions of Java. In the northern regions I never found them lower down than 500 meters.

The form given in an illustration by BINGHAM as that of the male from the dry season in India, corresponds to the female of Java, of which I possess specimens captured in the middle of the rainy season, like the one here reproduced. As regards this butterfly, I cannot distinguish separate forms for the dry and the rainy season no more than in any others. The males, which are darker, are usually smaller, sometimes however almost as large as the female. Some males from the Tengger mountains in East Java, seem to me to be darker on the upperside than the males from West Java. They are however no smaller than these.

All the different colour forms, depicted in SEITZ's work as sub-species, are nothing but different stages of colour evolution, occurring in one place in a more, and in another in a less advanced state.

BINGHAM gives a complete description of the larvae and pupae; the former he found on MAESA MONTANA. I found them on *ki piit* (MAESA INDICA Wall). It is a flat larva, resembling that of the Cocliopodae, of which, as BINGHAM says also, each segment is laterally rounded, handsome soft green with a dark dorsal line; on the sides short white hairs. It pupated flat upon the leaf, attached by an extremely fine girdle-thread as well as by the tail end, into a flat pupa, the broader head end of which was somewhat divided in two, and the segments of the abdomen were laterally sounded in the same way as those of the larva. It displayed a handsome marbling of green lines upon a lighter green ground.

The pupa formed on May 7th produced a butterfly on May 23.

Genus ABISARA Felder.

1. Atlas de Nic. (Pl. XIX, 4).

de Nicéville, *Journ. Bombay Soc. of Nat. Hist.* IX, *p.* 268, *pl. N., fig.* 10, 11 (1895)	Abisara Atlas.
Fruhstorfer (Seitz, *Groszschm. der Erde*), *p.* 786, *pl.* 138 (1914).	„ „

W. J. Tjampea (160); mount Mega Mendoung (1500); Prayangan mountains (1.000); Gedeh mountains (1200) (Fruhstorfer).

C. J.?

E. J.?

The specimen reproduced is a particularly light coloured female. Some are much darker, as are also the males, which otherwise do not differ much in markings from the female.

2. Echerius Stoll. (Pl. XIX, 5*a*, *b*, *c*).

Stoll, *Suppl. Cram.*, *p.* 40, *pl.* 31, *fig.* 1, 1*a*, 1*b* (1790)	Papilio Echerius.
Felder, *Wien, Ent. Mon.* IV, *S.* 397, *No.* 11 (1860)	Abisara Kausambi.
Distant, *Rhop. Mal.*, *p.* 189, *Tab.* 18, *fig.* 10, 11 (1882—86)	„ „
Moore, *Lep. Ind.* V, *p.* 83, *pl.* 401, *fig.* 1*a—e* (1901)	„ „
Bingham, *Fauna of Brit. India, Butt.* 1, *p.* 492 (1905)	Echerius Kausambi.

In Snellen's opinion, which is shared by Fruhstorfer, A. Echerius Stoll is still a very indefinite species. The latter thinks it therefore advisable to divide it into four species. Echerius Stoll, Kausambi Felder, Celebica Röb. and Kausambioides de Nic, of which only the second and the last would be found in Java. As this division, however, is still very uncertain, I prefer to include all these forms for the present under the old name of Echerius Stoll.

Fruhstorfer possesses two races of the form Kausambi, Erilda from W. J. (Pl. XXVII, 179*a* ♂, *b* ♀), and Geza from E. J. (Pl. XXVII, 180*a*, *b*). At my request he has had a drawing made of both of these, which I now publish. The Java race of the form Kausambioides he calls Tina. I am in possession of this form from Tjampea (160); from the mountain of Salak (750) and the vicinity of the Pelabouan Ratou or Wijnkoopsbay ± 150) in W. J. and from Malang (445) in E. J. an illustration of which, in both sexes, is given here.

I once had the larva, but time failed me to make an accurate description of it, or to compare it with the accompanying illustration. The illustration seems to me to be accurately made. BINGHAM gives the following description of it, after DAVIDSON and AITKIN. "Flat, very broad in the middle, tapering to both ends, clothed sparcely with short hairs; head small, not enclosed in the 2nd segment, colour light green."

The pupa, according to my brief notes, was of a peculiar form, light green, attached to the upperside of a leaf by the tail end and a girdle-thread. According to BINGHAM's description it is:—"clothed with hairs, and altogether so like the larva that it is difficult to note exactly when the change takes place. It is closely attached to a leaf by the tail and a girdle."

Genus TAXILA Dbd.

1. HAQUINUS F. (Pl. XIX, 6*a*, *b*).

FABRICIUS, *Ent. syst.* 3, 1, *p.* 55, *No.* 169 (1793) . . .	Papilio	Haquinus.
HORSFIELD, *Cat. lep. E. I. C.*, I, *pl.* 2, *fig.* 3, 3*a-g* (1828)	Emesis	Drupadi.
BOISDUVAL, *Spec. Gen.* I, *pl.* 7, *fig.* 2 (1836).	„	„
MOORE, *Proc. Zool. Soc. London* 1878, *p.* 832, *pl.* 52, *fig.* 1	Taxila	Fasciata.
DISTANT, *Rhop. Mal.*, *p.* 190, *Tab.* 18, *fig.* 13 (1882—86)	„	Haquinus.
BINGHAM, *Fauna of Brit. India, Butt.* 1, *p.* 497 (1905) .	„	„
FRUHSTORFER (SEITZ, *Groszschm. d. Erde*), *p.* 793 (1914).	„	„

FRUHSTORFER calls the Java variety given in my illustration DRUPADI Horsf.

W. J. Prajangan mountains (1500); vicinity of the Tjiletou or Sandbay on the south coast (± 150).

C. J.?

E. J.?

Genus STIBOGES Butl.

1. NYMPHIDIA Butl. (Pl. XIX, 7).

BUTLER, *Proc. Zool. Soc. London*, 1876, *p.* 309, *pl.* 22, *fig.* 1	Stiboges	Nymphidia.
DISTANT, *Rhop. Mal.*, *p.* 193, *Tab.* 24, *fig.* 11 (1882—86)	„	„
STAUDINGER, *Ext. Schm.*, *S.* 289, *Taf.* 87 (1886—88) .	„	„
OBERTHÜR, *Études Ent.* 18, *p.* 15, *pl.* 2, *fig.* 19 (1893)	„	„

Fruhstorfer, *Ent. Nachr.* 23, *S.* 62 (1897)	Stiboges	Calycoides.
Moore, *Lep. Ind.* V, *p.* 101, *pl.* 405, *fig.* 2-2*a* (1902).	„	Nymphidia.
Bingham, *Fauna of Brit. India, Butt.* 1, *p.* 105 (1905)	„	„
Fruhstorfer (Seitz, *Groszschm. d. Erde*), *p.* 796, *pl.* 139 (1914)	„	„

Fruhstorfer calls the Java variety Calycoides.

W. J. Gedeh mountains (1500); Prayangan mountains. (1500) (Sijthoff).

C. J.?

E. J.?

LYCAENIDAE [1]).

Genus MILETUS Hbn. Westw.

With this genus the peculiar group of the three genera of GERYDINAE begins, which is discussed in the Introduction. SNELLEN considers it desirable to retain the name MILETUS *Hbn.*

1. SYMETHUS Cram. (Pl. XIX, 8*a*, *b*, *c*, *d*, *e*, *f*).

CRAMER, II, *p.* 34, *pl.* 149, *B. C.* (1779)	Papilio Symethus.
STOLL, *Suppl. to Cramer, p.* 165, *pl.* 37, *fig.* 3-3*a* (1790)	„ „
HORSFIELD, *Cat. Lep. E. I. C., pl.* 22, *fig.* 2-2*a*—1 (1828)	Symetha Panda.
BOISDUVAL, *Spec. Gen.* I, *pl.* 23, *fig.* 2, 2*a-b* (1836) . .	Gerydus Symethus.
DISTANT, *Rhop. Mal., p.* 205, *Tab.* 20, *fig.* 2, *Tab.* 22, *fig.* 14 (1882—86)	„ „
BINGHAM, *Fauna of Brit. India, Butt.* II, *p.* 290 (1907).	„ „
SWINHOE, *Lep. Ind.* VII, *p.* 187, *pl.* 612, *fig.* 1, 1*a*, 1*b* (1905—10).	„ „
COURVOISIER, *Jav. Lycaen. Tijdschr. v. Entom.* IV, *p.* 15 (1912)	„ „
FRUHSTORFER, *Uebersicht der Gerydinae, Zeitschr. f. wiss. Insektenbiologie* IX, *S.* 242 (1913) . . .	„ „
„ (SEITZ, *Groszsch. d. Erde*), *p.* 821, *pl.* 141*a* (1916)	„ „

[1]) Prof. COURVOISIER's collection contains the following Lycaenidae labelled Java. The origin of these specimens, however, did not appear to me to be sufficiently certain for me to include them in the fauna of Java. They are:—ARHOPALA HERCULES, ARHOPALA DRUCEI, ARHOPALA ALITAEUS, JACOMA AMASUJA, and PORITIA PHILATA.

W. J. Batavia (3—14); Tjampea (160); Buitenzorg (265); Prayangan mts. (1500); Nousa Kambangan (20) JACOBSON).

C. J. Bodjonegoro (258).

E. J. Jember (98) province of Besouky; Kedyry (64) Tengger mts. (± 700) (FRUHSTORFER).

FRUHSTORFER considers that the variety from the Tengger mts. may be distinguished under the name of *Perlucidus*. I have not hat the opportunity of comparing it sufficiently with the others.

The eyes of this species are light green when alive. The butterfly is very common, and settles by preference in shading places. As it seems to me, they are only seen flying when they have been disturbed for some reason, while they then shudding settle again. In this respect they behave exactly like CYLLO LEDA L. and similar twilight butterflies, and I should therefore not be surprised if they had to be included amongst these.

In this species the darkening process of colour evolution, which, as explained in the Introduction, appears so characteristically in some GERYDINAE, can be observed most distinctly. In order to facilitate observation, the specimens of this species may be divided into groups, according as they are individually advanced in the process, that is, according as the original white colour is more or less concealed by dark scales. As, however, the process in question develops independently in each individual, the groups are naturally not sharply divided, but merge into one another.

The first form 8*a* is that of the females, which are apparently much less far advanced in the process in question than the males, showing thus the oldest of the forms, and as such, greatly resembling MILETUS ZINCKENI Felder, a nearly related species, in which the old form is still better preserved, and that in both sexes, and which therefore shows the colour scheme of the original general stock form of both species even more plainly, unless, which is also not impossible, M. SYMETHUS Cram. is differentiated from M. ZINCKENI. I possess, of this SYMETHUS form, 21 specimens, captured in the wet and in the dry season in Batavia and in other districts of W. Java, as well as two from E. Java, one from the mountain Semarou (750) and one from the Tengger mts. (700); all showing no more than individual differences. The white on the upperside of the primaries is, in some specimens, still much the same as in M. ZINCKENI Felder, but usually towards the posterior edge more or less eaten away as it were especially in the under part, so that there it ends in two points. The upperside of the secondaries is sometimes darker, and sometimes lighter, the white stripe, although in some cases light and in others heavier, is always quite

distinct. The underside is sometimes yellowish, sometimes darker brown; at the base of the primaries there is always a somewhat more extended dark patch which spreads a little way over the white (*a*). This spot occurs also in all the male forms, and is a good characteristic for the species. The specimen from the Tengger mts. is remarkably light on the underside, while both the white, upon the upperside of the primaries and the white line on the secondaries, is very strongly developed.

The second form 8*b* consists of the males least far advanced in the process of darkening. I possess 10 specimens of these; 6 captured in Batavia, some in the dry and some in the rainy season, and 4 specimens from the Semarou mts. (700) and from Malang (443) in E. Java. The last are the least far advanced; in these the extension of the white on the upperside of the primaries is difficult to distinguish from that in the female, described above as the first form; whereas in the specimens from Batavia 8*c* it is much more strongly affected by the darkening process, causing it to tail off in two points, which in the most advanced specimens narrow down to a white stripe at the lower end of the patch, still united to the rest of the patch, however.

The form 8*d* also consisting of males, is characterised by the same marked decrease of the size of the white patch on the upperside of the primaries, here so far advanced that it is divided into two patches, the lower of which is seen as a separate white line below the other, which is more oval. I have 30 specimens of this form, captured in Batavia, and 1 from Buitenzorg, the former taken both in the middle of the dry season and of the rainy season, without this apparently having the least influence upon their form. The under side is sometimes paler or sometimes darker; the stripe on the upperside of the secondaries always present in the first and second group, can often be seen in this group also, but is frequently almost or entirely absent.

In the form 8*e*, represented by eleven specimens from Batavia, taken both in the middle of the dry and of the rainy season, and one from Buitenzorg, the underside is again sometimes fainter and sometimes stronger in colour, and only the characteristic white spot on the upperside of the primaries remains, while the white stripe present there in the third group, has disappeared. Sometimes (8*f*) even the oval white spot has diminished in not much more than a relic, so that the white has almost entirely disappeared. Upon the underside of the primaries, however, there always remains something more of the white patch.

2. Zinckeni Felder (Pl. XIX, 9*a*, *b*).

Felder, *Novara*, *Lep.* II, *p.* 234, *pl.* 35, *fig.* 34 (1865) . Gerydus Zinckeni.
Fruhstorfer, *Uebersicht der Gerydinae*, *Zeitschrift f. wiss. Insektenbiologie* IX, *p.* 247 (1913) . . . . . „ „
Fruhstorfer (Seitz, *Groszschm. d. Erde*), *p.* 819, *pl.* 141*e* (1916) . . . . . „ „

This species, owing to its great resemblance to the more common preceding species is often confused with it. But although it is certainly nearly related and springs from the same original stock,—Symethus may even have been differentiated out of it,—yet, owing to the persistent difference between them, I consider that it must be looked upon as a separate species. I possess 5 males and 5 females, which all display the differences in question.

All Symethus specimens of both sexes show distinctly the peculiar dark stripe (*a*) on the underside of the primaries near the base, already mentioned when describing them. In Zinckeni this is entirely absent. Moreover in the female of Symethus, and usually in the male, the stripe on the upperside of the secondaries referred to is always present; this also is invariably absent in the Zinckeni. For the rest the upperside of the primaries is about the same in both sexes, and in this resembles the females of Symethus; the males of Symethus only exhibit this appearance as an exception, and then only in a somewhat incomplete form. The white upon the upperside of the primaries of Zinckeni is nearly the same as that in the female Symethus; it is, however, but little attacked by the darkening process and only shows the first beginnings of the sharp points in which it usually terminates in Symethus. Finally, on the lower edge of the secondaries of the females of Zinckeni we sometimes see very small points sticking out, the last remains of so-called tails, which occur also in M. Biggsii Dist.; of this there is nothing to be seen in Symethus. Miletus Zinckeni Felder is apparently another form, which has only been preserved in the higher mountains.

3. Boisduvalii Moore [1]) (Pl. XIX, 10*a*, *b*).

Moore, *Cat. Lep. E. I. C.*, I., *p.* 19, *pl.* 1*a*, *fig.* 1 (♀) (1857) Miletus Boisduvalii.
Staudinger, *Iris* II, *p.* 92, *Taf.* 1, *fig.* 2 (1889). . . „ Philippus.

[1]) Fruhstorfer, in Zeitschr. für wiss. Insektenbiologie, Heft 9—10, Band XI, S. 268 and in Seitz, *Groszsch. d. Erde*, p. 818, describes as a new species a form which he calls Gerydus Courvoisieri, from W. J. To me it appears, however, from his description to be only a specimen of this species in which the darkening process has not proceeded quite so far. Moreover I do not consider the particulars as to place of capture in the collection *Courvoisier* to be sufficiently reliable. See p. 7 note.

Elves, *Proc. Zool. Soc. of London*, 1892, *p.* 618. . .	Gerydus	Boisduvalii.
Druce, „ „ „ „ „ 1895, *p.* 561, *pl.* 31, *fig.* 9, 10	„	Vinculus.
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 292 (1907)	„	Boisduvalii.
Swinhoe, *Lep. Ind.*, VII, *p.* 189, *pl.* 61, *fig.* 1-1*e* (1905—10)	„	„
Courvoisier, *Jav. Lyc. Tijdschr. v. Entom.*, LV., *p.* 15 (1912)	„	„
Fruhstorfer, *Uebersicht der Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, IX, *S.* 308 (1913). . .	„	„
„ (Seitz, *Groszschm. d. Erde*), *p.* 817, *pl.* 141*e* (1916)	„	„

W. J. Batavia (3—14); Dépok (95); Tjampea (160); Buitenzorg (205); vicinity of the Tjiletou or Sandbay on the south coast (± 150); Prayangan mts. (600—800) Fruhstorfer.

C. J. One specimen, with no further indication of the place of capture.

E. J. Pouspa (630); Tengger mts. (100); Kedyry (64).

In this species there occurs, apparently, exactly the same process of darkening as in M. Symethus Cram., here, also, rainy or dry season, east or west of Java, make no difference in the colour. They are usually, especially the males, lighter on the underside than shown in the illustration; there is also more white upon the upperside of the primaries. This white is usually, but not always, more extensive in the females than in the males, in the last being often very much reduced. In Java, it is never so extensive as in the specimen from the dry season, reproduced by Swinhoe on pl. 613.

According to Moore in the work quoted above, seemingly confirmed by de Nicéville *in Butterflies of India*, III (1890), and referred to by Prof. Courvoisier, the larva lives upon Coccina, which is found on pinang and other kinds of palm, and is supposed to be cultivated by the ant Dolichoderus bituberculatus Mayr. Jacobson saw the larvae on pinang leaves, entirely covered by ants, so that he imagined that, like many aphididae, they secrete a sweet fluid, which is collected by ants; it would seem, therefore, that these larvae, like the Coccina species, were cultivated by the ants, but that the former—many Lycaenidae-larvae are carnivorous—also eat the Coccina. He also saw the female of this Miletus species, entirely surrounded by ants on a pinang leaf, laying eggs, without apparently minding the ants at all.

4. Biggsii Dist. (Pl. XIX, 11).

Distant, *Rhop. Mal.*, *p.* 206, *Tab.* 22, *fig.* 12 (1882—86)	Gerydus	Biggsii.
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 295 (1907) .	„	„

Swinhoe, *Lep. Ind.*, VII, *p.* 192, *l.* 614, *fig.p* 2-2*c* (1905—10)	Gerydus	Biggsii.
Fruhstorfer, *Uebersicht der Gerydinae, Zeitsch. f. wiss. Insektenbiologie*, IX, *p.* 307 (1913).	„	„
„ (Seitz, *Groszschm. d. Erde*), *p.* 819, *pl.* 141*g* (1916)	„	„

According to Swinhoe there is a Java-specimen of this species in the Brit. Mus. A specimen from W. Java with which I am acquainted was found in the mountains of the province of Bantam by a native hunter send out by Edward Jacobson, and is here reproduced. In the collection of Courvoisier there is a specimen from the Gedeh mts. in W. Java. I also possess a specimen from E. Java, the place of capture of which however cannot be more accurately stated.

Fruhstorfer possesses specimens from the mountains in the neighbourhood of Soukaboumi in W. Java, in which he thinks he can distinguish two forms, Artaxatus and Orchalia. It seems rather strange that in the same district there should be two different varieties.

Genus ALLOTINUS Felder.

Several species of this genus are characterized by a light streak on the upperside of the primaries. In the female it is often very faint, but in the male it is very distinct, which induces Fruhstorfer to call the streak a sexual stripe, erroneously however, as it has nothing to do with the difference of sex in itself, but is merely a relic of that white which formerly, as is still the case in many species of the genus Miletus, was much more extensive, but by the process of darkening in the genus Allotinus has become to a large extent concealed, and that considerably more in the female than in the male.

1. Horsfieldii Moore (Pl. XIX, 12, 14*a*, *b*).

Moore, *Cat. Lep. E. I. C.*, I, *p.* 19, *pl.* 1*a*, *fig.* 2 (1857)	Miletus	Horsfieldii.
Distant, *Rhop. Mal.*, *p.* 207, *Tab.* 20, *fig.* 7 (1882—86)	Paragerydus	„
Staudinger, *Exot. Schm.*, *p.* 269, *Taf.* 94 (1884—88)	Miletus	„
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 299 (1907)	Allotinus	„
Swinhoe, *Lep. Ind.*, VII, *p.* 198, *fig.* 1—1*c* (1905—10)	„	„
Fruhstorfer, *Uebersicht der Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, X, *S.* 344, (1913) . .	„	„
„ (Seitz, *Groszschm. d. Erde*), *p.* 812 (1916)	„	„
„ „ „ „ „ *p.* 814, *pl.* 141 *g*, *h* (1916)	„	Posidion.

BINGHAM gives Colonel H. J. W. BARROW's observation of how this butterfly, just as various ants do with their antennae, strokes aphides with its fore-legs, causing them to secrete a sweet fluid, which it presumably sucks up; and he gives an enlarged illustration of it.

W. J. Tjampea (160); Buitenzorg (265); Prayangan, vicinity of the Wijnkoopsbay or Palabouan Ratou and the Sandbay or Tjiletou (± 150) on the south coast; Province of Bantam.

C. J. Bodjonegoro (258).

E. J. Kedyry (64).

This species does not seem to occur in the districts about the north coast; at least in Batavia, a district which I particularly investigated, I never found it, but in somewhat higher places it becomes common. It occurs both in W. J. and in E. J. in two forms, one of which is larger than the other, and in which, moreover, the relic-stripe in the ♂ is somewhat longer and broader, which induces FRUHSTORFER to distinguish the smaller kind as a separate species under the name of POSIDION. It is, however, apparently only due to a difference in evolution; the largest of which I possess only ♂, is the least advanced; the most we can say, therefore, is that there is a form POSIDION. According to FRUHSTORFER there is a difference between the genitals of the ♂ of both forms, but, as discussed on p. XXXI of the Introduction, this occurs in other cases between forms of the same species in a different stage of colour evolution, and does not constitute a specific difference. Of the ♀, I only know specimens which correspond in size to the last form. The upperside is dark brown, the relic-stripe is lighter and in the ♀ does not form a stripe, but spreads out into a lighter coloured patch.

The underside is greyish, with a number of small brown stripes and dots.

2. SUKA N. S. (Pl. XIX, 12*b*, Pl. XXVII, 181).

To this species I reckon a ♂ and a ♀ in my possession which I regard as a separate species, and therefore have given the name SUKA, an abbreviation of the name of the place where they were found, SUKABUMI (± 600), in W. J. The ♂ which corresponds in size to the form POSIDION of the former species, resembles it strongly on the upperside too; and the ♀, although larger than my ♀ of that species, also resembles it on the upperside—whether the relic-stripe of this ♀ spreads out in the same way, cannot be seen in my somewhat damaged specimen. But the underside of this species is, in both sexes, chalk-white, with only quite insignificant lines and dots upon it. This constitutes a distinct difference with the other species, and shows that the two specimens belong together as the two sexes of one species.

3. Taras Doh. (Pl. XIX, 16).

Doherty, *Journ. A. S. B.* 58, *p.* 2, *pl.* 23, *fig.* 10 (1889)	Paragerydus	Taras.
de Nicéville, *Butt. of India*, III, *p.* 27 (1890). . . .	„	„
Swinhoe, *Lep. Ind.*, VII, *p.* 199, *pl.* 617, *fig.* 2—2*c* (1905—10)	Allotinus	„
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 300 (1907).	„	„
Fruhstorfer, *Uebersicht der Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, IX, *p.* 270 (1913) . . .	„	„
„ (Seitz, *Groszschm. d. Erde*), *p.* 813 (1916)	„	„

Fruhstorfer procured this species at Sukaboumi (± 600) in W. J. He distinguishes the Java form as Narsares. I know this species only from the accompanying illustration, sent me by Fruhstorfer, which seems to me not to agree with the description of Taras more especially as regards the underside. I possess a specimen also which greatly resembles the illustration, but the underside of which is more greyish; but by no means of the same chalky-white as the former species.

4. Unicolor Felder. (Pl. XIX, 13*a*, *b*).

Felder, *Novara Lep.*, *p.* 286 (1864)	Allotinus	Unicolor.
Distant, *Rhop. Mal.*, *p.* 209 (1884)	„	„
Fruhstorfer, *Uebersicht der Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, IX, *p.* 369 (1913) . . .	„	„
„ (Seitz, *Groszschm. d. Erde*), *p.* 810, *pl.* 141*i* (1916)	„	„

This species is in colour exactly like A. Horsfieldii, but is much smaller. The relic-stripe is also present in the same way, and the female is somewhat smaller than the male, while her relic-stripe is often only indicated by a slightly paler tint in the discal area of the upperside of the primaries.

W. J. Buitenzorg (265); vicinity of Pelabouan Ratou or Wijnkoopsbay on the south coast (± 150).

C. J. Bodjonegoro (258).

E. J.?

I had the larva once in Buitenzorg at the end of March. Its segments are clearly divided from one another, as in the larva of Zemeros Flegyas Cram. Except for this it is a characteristic Lycaenidae larva, the black head is concealed, as in so many of these larvae, under the first thoracic segment. The sides are steeply inclined, each segment has on each side a pointed protuberance,

and also two similar subdorsal protrusions. The larva is light brown, mixed with some black, the first segment in particular is very light in colour. The pupa is oblong, and hangs according from the tail-end, attached by a girdle-thread also; it is brown, with black marbling, and has two short protuberances at the head end.

5. Aphocha Kheil. (Pl. XIX, 15*a*, *b*).

Kheil, *Rhop. Ins. Nias.*, *p.* 28 *u.* 79, *pl.* V, *fig.* 30 (1884)	Allotinus Aphocha.
Fruhstorfer, *Uebersicht d. Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, IX, *p.* 370 (1913) . . .	„ „
„ (Seitz, *Groszsch. d. Erde*), *p.* 810 (1916).	„ „

Fruhstorfer distinguishes the Java form as Enatheus, and caught it in the vicinity of Soukaboumi (± 600) in W. Java. My specimens are from Buitenzorg (265) W. Java.

6. Strigatus Moulton. (Pl. XX, 17).

Fruhstorfer, *Uebersicht d. Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, X, *p.* 22 (1914)	Allotinus Strigatus.
„ (Seitz, *Groszsch. d. Erde*), *p.* 813, *pl.* 141 (1916)	„ „

Fruhstorfer mentions a Java form of this species, which he distinguishes as Dositheus, in W. Java. This species is unknown to me.

7. Portunus de Nic. (Pl. XX, 18*a*, *b*).

de Nicéville, *Journ. Asiat. Soc. of Bengal*, LXIII, *p.* 27, *pl.* 5, *fig.* 14 (1894)	Paragerydus Portunus.
Fruhstorfer, *Uebersicht d. Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, X, *p.* 24 (1914) . . .	Allotinus „
„ (Seitz, *Groszschm. d. Erde*), *p.* 813, *pl.* 141*i* (1916).	„ „

W. J. male Gedeh mountains (1400); female Patjet (1114); male and female Salak mountains (780); male and female vicinity of the Wijnkoopsbay (Pelabouan Ratou) and the Sandbay (Tjiletou) on the south coast (± 150).

C. J.?

E. J.?

On the upperside of the male of this species the darkening process has developed in the same manner as in the above mentioned species; the relic-stripe is also very distinct. But the underside has become darkened to a uniform light brown colour.

From various districts of W. Java I procured 7 specimens, all males. The female is still unknown. But I possess 6 specimens of a species as yet never described, which, it is true, do not resemble these males, but are more like the female of A. UNICOLOR Felder and also A. WATERSTADTI Druce, but which are all females, and were caught in the same districts of W. Java as PORTUNUS. Moreover, the peculiar characteristic of the male, the light brown colour of the underside, is also present in them, although in a much less degree, only along the edges, and particularly upon the apex of the primaries; thus distinguishing this butterfly from the female of A. UNICOLOR Felder distinctly and uniformly.

For these reasons, I think that this female, of which I here give a good reproduction, may for the present be taken as the female of A. PORTUNUS. FRUHSTORFER believes that he has in his possession a ♀ of the same as the ♂ of this species and considers the ♀ reproduced by me to be that of A. STRIGATUS Moulton which I do not know, and of which I never found a ♂ in this neighbourhood.

8. NIVALIS Druce (Pl. XX, 19).

DRUCE, *Proc. Zool. Soc. of London*, 1873, *p.* 348 . .	Miletus Nivalis.
DISTANT, *Rhop. Mal.*, *p.* 207, *Tab.* 22, *fig.* 11 (1882—86)	Paragerydus „
MOORE, *Journ. Linn. of London*, 21, *p.* 39, *pl.* 3, *fig.* 8 (1886)	Logania Substrigosa.
BINGHAM, *Fauna of Brit. India, Butt.* II, *p.* 301 (1904)	Allotinus Nivalis.
SWINHOE, *Lep. Ind.*, VII, *p.* 197, *pl.* 616, *fig.* 2, 2*a*, 2*b* (1905—10)	„ „
FRUHSTORFER, *Uebersicht d. Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, IX, *p.* 370 (1913). . .	„ „
„ (SEITZ, *Groszschm. d. Erde*), *p.* 810, *pl.* 141*g* (1916)	„ „

W. J. Vicinity of the Tjiletou of Sandbay on the south coast (± 150).
C. J.?
E. J.?

In this species, of which I only possess one specimen from Java, the darkening of the upperside has developed to a uniform brown, upon which the relic-stripe is also faintly visible. On the underside the white is only a little obscured by a few dark scales, and thus is still pretty clear; but on the

secondaries the same process has caused a comparatively larger agglomeration of these scales, which form a round black patch, contrasting in a peculiar manner with the white, the same as occurs, probably produced by the same cause, most distinctly in LYCAENA HYLAX F., and in a less degree in other Lycaenae. This matter has been already discussed in the Introduction.

9. SUBVIOLACEUS Felder (Pl. XX, *a*, *b*, *c*).

FELDER, *Novara Lep.*, *p.* 285, *No.* 368, *Taf.* 35, *fig.* 27, 28 (1867) . . . . . Allotinus Subviolaceus.
DISTANT, *Rhop. Mal.*, *p.* 452, *Tab.* 44, *fig.* 3 (1882—86) „ Alkamah.
STAUDINGER, *Iris*, II, *S.* 93 (1889) . Allotinus Subviolaceus, var. Alkamah.
BINGHAM, *Fauna of Brit. India*, *Butt.* II, *p.* 300 (1907) Allotinus Subviolaceus.

W. J. Batavia (3—14); vicinity of the Tjiletou or Sandbay on the south coast (± 150)

C. J.?

E. J.?

Although on the underside of this species the same process of darkening has been followed peculiar to many ALLOTINUS species, displaying a uniform light brown colour, with darker scales spread here and there, on the upperside the colour has been obstinately preserved, which probably belonged to the GERYDINAE in general before they were vigorously attacked by the darkening process, that is, the colour of a Lycaenida which has faded to white, but owing to a structural blue has become bluish in colour› and in which the darkening process, as is the case with many of these Lycaenidae, spreads in broad black or brown bands along the edges of the wings. The specimens that I have bred are considerably smaller than the captured ones.

I found the larva frequently on the leaves of *nangka blanda* (ANONA MURICATE L.); it was also brought to me as having been found on the young leaves and young fruit of *roukem besar* (?), but I never saw it feeding. Perhaps, like those of some other GERYDINAE it lives upon plant lice; it is certainly carnivorous, as of two that I kept together in one box, one was speedily devoured bij the other. It is roof-shaped, the back higher than the rather sharply sloping sides. The segments, distinctly separated from one another, end at the sides in protruding knobs or warts. The back is sometimes lighter and sometimes darker bark-coloured brown, with a not always distinct darker dorsal stripe, and two light sub-dorsal lines. The posterior segments are mainly whitish in colour. Head shiny black. The brown pupa has the characteristic shape

of a hanging pupa, but is without protuberances, and hangs accordingly by the posterior end, very strongly attached and also with a girdle-thread.

A pupa from Jan. 15th gave a butterfly on the 23rd of the month, and one from Feb. 9th on Feb. 18th.

Genus LOGANIA Distant.

1. Marmorata Moore (Pl. XX, 21).

Moore, *Journ. Soc. of Bengal*, 53, *p.* 22 (1884). . .	Logania	Marmorata.
„ *Journ. Linn. Soc. of London*, 21, *p.* 39, *pl.* 3 *fig.* 7 (1886)	„	„
Distant, *Ann. & Mag. of Nat. Hist., Serie* 5, 19, *p.* 260 (1887).	„	Obscura.
Staudinger, *Iris* II, *p.* 93, *Taf.* 1, *fig.* 3 (1889) . .	Allotinus	Distanti.
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 302 (1907)	Logania	Marmorata.
Swinhoe, *Lep. Ind.* VII, *p.* 201, *pl.* 618, *fig.* 1, 1*a* (1905—10)	„	„
Fruhstorfer, *Uebersicht der Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, X, *p.* 23 (1914). . . .	„	„
„ (Seitz, *Groszschm. d. Erde, javanica*), *p.* 806, *pl.* 141*f* (1916)	„	„

W. J.?
C. J.?
E. J.? Tengger mountains (± 600) (Fruhstorfer).

2. Massalia Doh. (Pl XX, 22*a*, *b*).

Doherty, *Journ. As. Soc. Bengal*, 1891, *p.* 37, *pl.* 1, *fig.* 8 ♀	Logania	Massalia.
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 304 (1907) .	„	„
Swinhoe, *Lep. Ind.*, VII, *p.* 203, *pl.* 618, *fig.* 3-3*d* (1905—10)	„	„
Fruhstorfer, *Uebersicht der Gerydinae, Zeitschr. f. wiss. Insektenbiologie*, X, *p.* 24 (1914)	„	„
„ (Seitz, *Groszschm. d. Erde*), *p.* 807, *pl.* 141*f* (1916)	„	„

Fruhstorfer distinguishes the Java specimens as Munichya from W Java, and Glypha from E. Java.

W. J. Vicinity of the Wijnkoopsbay (Pelabouan Ratou) and the Sandbay

(Tjiletou) (± 150). Some specimens, including the pair reproduced, *in coitu;* without further indication of place of capture (FRUHSTORFER).

C. J.?

E. J. Without further indication of place of capture (FRUHSTORFER).

Genus PORITIA Moore.

1. ERYCINOIDES Felder (Pl. XX, 23*a*, *b*).

FELDER, *Novara Lep.*, *p.* 259, *Taf.* 30, *fig.* 23, 24 (1867)	Pseudodipsas	Erycinoides.
DISTANT, *Rhop. Mal.*, *p.* 199, *Tab.* 24, *fig.* 8 (1882—86)	Poritia	Phraatica.
DRUCE, *Proc. Zool. Soc. of London*, 1895, *p.* 566, *pl.* 31, *fig.* 15.	„	Phaluke.
BINGHAM, *Fauna of Brit. India*, *Butt.* II, *p.* 461 (1907)	„	Erycinoides.
SWINHOE, *Lep. Ind.*, VIII, *p.* 112, *pl.* 665, *fig.* 3, 3*a*, 3*b* (1910—11)	„	„
FRUHSTORFER, *Uebersicht d. Lyc. Berl. Ent. Z.*, LVI, *S.* 190 (1911).	„	„

W. J. Prayangan mountains (1600); Gedeh mountains (Coll. COURVOISIER).

C. J.?

E. J. province of Pasourouan; Lawang (500); (FRUHSTORFER); Tengger mountains (Coll. COURVOISIER).

FRUHSTORFER thinks he is able to distinguish here the forms *Demaculata Nankydes* and *Princivalis*.

FRUHSTORFER sent me an illustration of a ♀ from his collection, in which the upperside of the primaries has become quite black, showing that there the colour evolution is in another stage of progress (Pl. XXVII, 182).

2. PROMULA Hew. (Pl XX, 24*a*, *b*).

HEWITSON, *Trans. Ent. Soc. of London*, 1874, *p.* 347 . .	Poritia	Promula.
„ *Ill. Diurn. Lep.* 8, *p.* 216, *pl.* 88, *fig.* 12, 13 (1878)	„	„
DRUCE, *Proc. Zool. Soc. of London*, 1895, *p.* 568, *pl.* 31, *fig.* 18	„	Phama.
BINGHAM, *Fauna of Brit. India*, *Butt.* II, *p.* 464 (1907). .	„	Pleurata.
FRUHSTORFER, *Uebersicht d. Lyc. Berl. Ent. Z.*, LVI, *S.* 200, (1911)	„	„

W. J. Prayangan mountains (1600).

C. J.?

E. J. Fruhstorfer.

3. Phalena Hew. (Pl. XX, 25).

Hewitson, *Trans. Ent. Soc. of London*, 1874, *p.* 344 . .	Poritia	Phalena.
„ *Ill. Diurn. Lep.* 8, *p.* 216, *pl.* 89, *fig.* 14, 15 (1878)	„	„
Distant, *Rhop. Mal.*, *p.* 200, *Tab.* 22, *fig.* 8 (1882—86)	„	„
Druce, *Proc. Zool. Soc. of London*, 1895, *p.* 568 . . .	„	„
Swinhoe, *Lep. Ind.*, VIII, *p.* 118, *pl.* 667, *fig.* 1-1*c* (1910—11)	Simiskina	„
Fruhstorfer, *Uebersicht d. Lyc. Berl. Ent. Z.*, LVI, *S.* 201 (1911).	Poritia	„

W. J. Prayangan mountains (1600); Gedeh mountains (2000) (Fruhstorfer).
C. J.?
E. J.?

Genus DORAMAS Dist.

1. Livens Dist. (Pl. XX, 26*a*, *b*).

Distant, *Ann. & Mag. Nat. Hist.*, V, 17, *p.* 252 (1886)	Doramas	Livens.
„ *Rhop. Mal.*, *p.* 451, *Tab.* XLII, *fig.* 15 (1882—86)	„	„
de Nicéville, *Butt. of Ind.*, III, *p.* 36 (1890). . . .	„	„
„ „ *Bombay Journ. of Nat. Hist.*, V, *p.* 208, *pl. E*, *fig.* 3 (1890).	Zarona	Pharygoides.
Fruhstorfer, *Societas entomologica*, XXXII, *No.* 10 . .	„	Livescens.

This species was caught by Fruhstorfer in the Gedeh mountains in W. Java. He calls the Java form Livescens. Also in E. Java.

Genus SPALGIS Moore.

1. Substrigata Sn. (Pl. XX, 27*a*, *b*, *c*).

Snellen, *Tijdschr. v. Ent.*, XXI, *p.* 25, *pl.* 1, *fig.* 2 (1877—78)	Lucia	Substrigata.
Pagenstecher, *Jahrb. d. Nass. V. für Naturk.*, XXXVII, *p.* 41 (1884)	„	„
Semper, *Schmett. d. Phil.*, I, *p.* 159 (1886—92). . . .	Spalgis	„

W. J. Batavia (3—14).

C. J. Bodjonegoro (258); Ambarawa (500) (Ludekring).

E. J. With no further indication of the place of capture.

The butterfly given as SPALGIS EPIUS by Courvoisier, captured by JACOBSON on Nousa Kambangan (20) on the south coast, is in all probability this species.

When alive, the butterfly has very light green eyes. I received the pupa attached to a young *dadap* leaf (ERYTHRINA HYPAPHORUS Boerl.) and on a *touri* leaf (SESBANIA GRANDIFLORA Poir) and I was told that the caterpillars lived upon such leaves. I have not observed this myself, and of a very nearly related species, upon which E. H. AITKIN has written a paper entitled "*The Larvæ and pupa of Spalgis Epius Westwood*" (*Journ. Bombay Nat. Hist. Soc.* VIII), DE NICÉVILLE says that the larva is carnivorous and feeds upon SCHIRZONEURINAE. The pupa is very small, and bears a remarkable resemblance to a monkey's head. It is too small to make a drawing of; I give, therefore, one taken from an enlargement of the pupa, in which of course, this resemblance is lost, just as the face on the moon disappears when a picture is made of the enlarged disc. The resemblance does not of course really exist, but is only due to defective observation, occasioned in this case, by the smallness of the pupa. In the paper above referred to there are what the author calls two greatly magnified illustrations of such pupae, of nearly related species, in which the resemblance to a monkey's head is very striking. But this is only imaginary, the illustrations only give an enlargement of the impression which the draughtsman got when he saw the pupa, but not what enlargement really shows us, where the resemblance is destroyed. The same applies to the enlarged reproduction given by MOORE.

Genus TARAKA de Nic.

It seems that the certainly very ancient evolutionary process which causes the fore-legs of the Rhopalocera to gradually disappear, and which in the Lycaenidae has so far only attacked the tarsi of the male, is not in the same stage in the genus TARAKA as in the other Lycaenidae. The data of different observers on this point do not, however, agree, and I am not in possession of sufficient material to enter into an investigation of the subject.

1. HAMADA Druce. (Pl. XX, 28).

DRUCE, *Cistula Ent.*, I, *p.* 361 (1857) . . . . . Miletus Hamada.
DE NICÉVILLE, *Journ. As. Soc. Bengal*, LII, *p.* 76, *pl.* 1,
fig. 16 (1883) . . . . . „ „

ELVES, *Trans. Ent. Soc. London*, 1884, *p.* 374, *pl.* 11, *fig.* 2 . . . . . Neopithecops Hamada.
DE NICÉVILLE, *Butt. of India*, III, *p.* 58, *pl.* 26, *fig.* 164 (1890) . . . . . Taraka „
BINGHAM, *Fauna of Brit. India, Butt.* II, *p.* 312 (1907) „ „
SWINHOE, *Lep. Ind.*, VII, *p.* 237, *pl.* 629, *fig.* 2—2*d* (1905—10). . . . . „ „

W. J. Province of Prayangan (1500).
C. J.?
E. J. de Nicéville gives this species as occuring in E. J.
The specimen reproduced, the only one that I possess, is probably a male.

Genus LYCAENA F. [1])

SNELLEN, as is the custom with Lepidopterists, gives the expansion of each species in this genus in m.m. I shall not follow him in this, as I do not attach much value to these measurements; seeing that in the specimens of many species there is a great variety in size. I do not wish, either, to adopt the so-called key as prepared by SNELLEN for distinguishing these species. As in his systematic arrangement he does not accept the subgenera proposed by various writers, because, in his opinion they do not bear sufficiently constant characteristics, and the key aspires to arrange 52 different species, it cannot, in my opinion, with al its divisions and subdivisions fulfil its object of avoiding confusion on the subject. I attach more value to faithful reproductions, of which there is still great need, for although DRUCE, BINGHAM and DE NICÉVILLE have done much good work in this respect,—SWINHOE's reproductions as a rule, leave much to be desired—it is by no means certain that the specimens to be found in Java of the same species are exactly the same as those reproduced by them. I shall, therefore, make a particular point of the illustrations.

Where SNELLEN has described new species I consider that his descriptions translated into English, as they have so far appeared in Dutch only, should be included in the revised and abbreviated form which he prepared afterwards for this monograph on the Java rhopalocera.

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[1]) DE NICÉVILLE also gives the species ZALMORA Butl. I myself do not know any Java-specimens of this.

1. Hylax F. (Pl. XX, 29*a*, *b*).

Fabricius, *Syst. Ent.*, *p.* 526, *No.* 351 (1775)	Papilio	Hylax.
Horsfield, *Cat. Lep. E. I. C.*, *p.* 66, *pl.* 1, *fig.* 2, 2*a*, 2*b* (1828)	Pithecops	„
Staudinger, *Exot. Schm.*, *S.* 271, *Taf.* 94 (1884—88) . .	Lycaena	„
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 308 (1904). .	Pithecops	„
Swinhoe, *Lep. Ind.*, VII, *p.* 232, *pl.* 628, *fig.* 1—16 (1905—10)	„	„
Courvoisier, *Jav. Lyc. Tijdschr. v. Ent.*, LV, *p.* 15 (1912)	„	„

W. J. Batavia (3—14); Buitenzorg (265).

C. J. In the vicinity of Touban on the W. coast; Bodjonegoro (258); Srondol in the province of Semarang (200), (Jacobson).

E. J. Mount Semarou (800); Southern mountains, along the south coast; Kedyry.

The butterfly is not uncommon in Java. There is great variety in size, although this has no connection with the place or time of capture. The largest are males from W. Java. The larve is found upon *katja piring* (Gardenia Florida L. = Jasminoides Ellis). It is the usual shape of Lycaena larvae, in various shades of green, with a more or less distinct brown dorsal stripe; some larvae become even quite brown later. The small pupa is also green, with dark brown or black marbling more or less extensive; the pupae are sometimes very dark; the ventral side is of a lighter colour. A pupa of March 21rt produced a butterfly on March 27th, one from April 27th, one on May 4th.

2. Roxus Godt. (Pl. XX, 30).

Godart, *Enc. Méth.*, IX, *p.* 659, *No.* 142 (1819—23)	Polyommatus	Roxus.
Horsfield, *Cat. Lep. E. I. C.*, *p.* 70, *pl.* 2, *fig.* 4, 4*a* (1828)	Lycaena	„
Distant, *Rhop. Mal.*, *p.* 216, *No.* 3, *Tab.* 22, *fig.* 24 (1882—86)	Castalius	„
de Nicéville, *Journ. As. Soc. of Bengal*, 66, *p.* 558, *pl.* 2, *fig.* 10 (1897)	„	Roxena.
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 768 (1907)	„	Roxus.
Swinhoe, *Lep. Ind.*, *p.* 243, *pl.* 631, *fig.* 2, 2*a*, 2*b* (1905—10)	„	„

W. J. Vicinity of Wijnkoopsbay (Pelabouan Ratou) on the south coast (± 150); mount Gedeh; near Sukabumi (± 600); Nousa Kambangan (20) (Jacobson).

C. J. Vicinity of Touban on the north coast; Bodjonegoro (258).

E. J. Province of Banyouwangy; Kedyry (64).

This species is not uncommon in the lower districts of Java. The size differs, the largest specimen that I possess is from E. Java.

3. Elna Hew. (Pl. XX, 31).

Hewitson, *Exot. Butt. V Lyc., pl.* 1, *fig.* 8 (1876) . . .	Lycaena	Elna.
Distant, *Rhop. Mal., p.* 217, *Tab.* 20, *fig.* 4 (1882—86) .	Castalius	„
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 430 (1907) . .	„	„
Swinhoe, *Lep. Ind.*, VII, *p.* 246, *pl.* 632, *fig.* 2, 2*a*, 2*b* (1910)	„	„

W. J. Tjampea (160); in the department of Buitenzorg.

C. J.?

E. J. Without further indication of the locality.

This species also differs in size. But in my eleven specimens I cannot find those differences of marking, neither that arising from sex, nor that from difference of season, which Swinhoe reproduces, mine being all marked alike.

4. Ethion Dbd. and Hew. (Pl. XX, 32*a*, *b*, *c*, *d*).

Doubleday & Hewitson, *Gen. D. L., p.* 490, *pl.* 76, *fig.* 3 (1850)	Lycaena	Ethion.
Hewitson, *Exot. Butt. V. Lyc., pl.* 1, *fig.* 5 (1876) . . .	„	„
Distant, *Rhop. Mal., p.* 216, *Tab.* 22, *fig.* 25 (1882—86).	„	„
de Nicéville, *Butt. of India*, III, *p.* 198 (1890)	Castalia	„
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 426 (1907) . .	„	„
Swinhoe, *Lep. Ind.*, VII, *p.* 241, *pl.* 630, *fig.* 2—2*c* (1905—10)	„	„

W. J. Batavia (3—14); Depok (95); Tjampea (160).

C. J. Bodjonegoro (258).

E. J. Without further indication of place of capture (Collection Courvoisier).

I had the larva several times, but was not informed with certainty of its food-plant. According to my information it was supposed to eat the leaves of the plant which at Batavia is called *bidara outan* (presumably Zizyphus Jujuba Lam) or also *douri tjandel.* It is of an arched long oval shape, so that when it walks, all the legs can be distinctly seen, which is not the case with most Lycaena larvae. In colour it is green, divided into different shades. There is a very dark green dorsal stripe, while on both sides the green is very light in colour; whitish green transverse lines show the divisions between the segments.

It is covered with very short hairs, longer at the sides, which are sometimes reddish and sometimes white. The pupa is light green, with some dark dorsal marbling; from a pupa formed on March 5th a butterfly was produced

on March 12th. Bingham and Swinhoe describe the larva and pupa of British India, after Davidson Bell and Aitkin; the larva there too lives upon Zizyphus Jujuba. Their description is about the same as mine. Swinhoe gives an illustration of both, in my opinion not a successful one. My reproductions are somewhat enlarged, but as such fairly satisfactory.

5. Rosimon F. (Pl. XX, 33*a*, *b*, *c*).

Fabricius, *Syst. Ent.*, *p.* 523, *No.* 341 (1775)	Papilio	Rosimon.
Cramer, *I, bld.* 105, *pl.* 67 *F. G.* (1779).	„	Clyton.
„ *IV, bld.* 97, *pl.* 340 *C—E* (1782)	„	Coridon.
Distant, *Rhop. Mal.*, *p.* 215, *Tab.* 22, *fig.* 20 (1882—86)	Castalius	Rosimon.
Semper, *Schm. d. Phil.* I, *S.* 188, *Taf.* 33, *fig.* 14 (1886—92)	„	Monrosi.
de Nicéville, *Butt. of India*, III, *p.* 197 (1890) . . .	„	Rosimon.
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 424 (1907) .	„	„
Swinhoe, *Lep. Ind.*, VII, *p.* 239, *pl.* 630, *fig.* 1—1*g* (1905—10)	„	„
Courvoisier, *Jav. Lyc. Tijdschr. v. Entom.*, LV, *p.* 17 (1912)	„	„

W. J. Batavia (3—14); Depok (95); vicinity of the Pelabouan Ratou or Wijnkoopsbay (± 150).

C. J. Semarang (60); Bodjonegoro (258).

E. J. Mount Semarou (750).

The butterfly is very common in Batavia. I see no difference between a male from E. Java and those from Batavia. The male in Batavia is sometimes lighter and sometimes darker, and this is the case with specimens found both in the rainy season and in the driest period of the dry season; seasonal differences are not to be observed. In this species also there is a difference in size between individuals. The blue metallic shimmes on the upperside of the male is absent in some specimens.

The larva, on *bidara* (Zizyphus Jujuba Lam.) is yellowish green, with a dorsal stripe of a lighter shade, next to which the green is darker than elsewhere. The division between the segments is shown by light yellowish green cross lines. When magnified, numerous white dots are seen on the larva, and it is seen to be covered by short white or reddish hairs, which also stick out along the sides. It differs very greatly in size, the largest specimens were 13 mms long and 5 mms broad. The pupa, attached by a girdle-thread, is sometimes light and sometimes dirty green, with a brown dorsal line; it is further more or less speckled with brown. A pupa of May 16th gave a butterfly on May 23rd, one of May 17th, on May 24th.

Bingham mentions that the larva is also found on the same plant in British India, and gives a description of the larva and pupa which differs slightly but not essentially from mine.

6. Plinius F. (Pl. XX, 34*a*, *b*, *c*).

Fabricius, *Ent. Syst.*, *III*, 1, *p.* 284, *No.* 92 (1793) . .	Hesperia	Plinius.
Donovan, *Ins. of India*, *pl.* 45, *fig.* 1 (1800)	Papilio	„
Moore, *Lep. of Ceylon*, I, *p.* 82, *pl.* 36, *fig.* 4 (1881) .	Tarucus	„
de Nicéville, *Butt. of India*, III, *p.* 194 (1890) . . .	„	„
Bingham, *Fauna of Brit. India*, *Butt.* II, *p.* 420 (1907) .	„	„
Swinhoe, *Lep. Ind.*, VIII, *p.* 49, *pl.* 651, *fig.* 2—2*d* (1910—11)	Syntarucus	„

W. J. Batavia (3—14); Buitenzorg (265): province of Prayangan.

C. J. In the vicinity of Touban, on the south coast.

E. J. Mount Ardjouno (1.000); Kedyry (64); Pouspa (630).

In this butterfly I cannot find the seasonal differences either, which, according to Swinhoe, exists in British India. The butterfly is very common in Java, and I possess various females, but in none of them can I find the broad black band upon the upperside of the primaries as on the wet-season brood female be reproduces. The only thing is that the black marking on the upperside of the primaries of the female seems in general to be more compact in the specimens from E. Java than those from W. Java.

Röber—as Snellen here notes (*Tijdschrift v. Ent.*, 1891, p. 303), inclines to combine this species with the species L. Telicanus Lang, found in Europe and Africa; so far no transitional forms are, however, known to me. The blue of the upperside of this species is darker and more purple than in Plinius, and the ground of the underside more grey, while the dark grey transverse stripe on the primaries is distinctly straighter.

The larva, of the usual Lycaena form, and in which I found the parasitical fly Leiosia Flavisquama Wulp, feeds on the flowers of Plumbago Capensis Thumb. It varies very much in ground-colour, which is sometimes green in all possible shades, and sometimes lighter or darker red or brown, upon which is a darker dorsal stripe not extending to the 1st thoracic segment and becoming narrower towards the end. The colour of back and sides is mixed with white, or whitish. On the ventral edge also a whitish line. The head is dark. The pupa also light or dirty olive green, but sometimes red or brownish with fine darker marbling and a darker dorsal line. Pupae of Febr. 26th and 28th produced butterflies on March 2nd and 7th.

Bingham gives a description from British India of larva and pupa, which agrees on the whole with mine. There too it has been observed that the larva feeds on the flower-buds of Plumbago.

7. Celeno Cram. (Pl. XX, 36*a*, *b*, *c*).

Cramer, *I, bld.* 51, *pl.* 31 *C. D.* (1779).	Papilio Celeno.
Semper, *Schm. d. Phil.*, I, *S.* 182, *Tab.* 83, *fig.* 8 (1886—92)	Lycaena „
Courvoisier, *Jav. Lyc. Tijdschr. v. Ent.*, LV, *p.* 17 (1912)	Lampides „

W. J. Batavia (3—14); Depok (95); Buitenzorg (265); mount Gedeh; Soukaboumi (600); Sindanglaya (1074); Soukapoura; Prayangan mts. (1550); vicinity of Pelabouan Ratou or Wijnkoopsbay (± 150) on the south coast; mountains of the province of Bantam.

C. J. Province of Pekalongan; province of Tegal; Srondol; Tjandi (60); vicinity of Touban on the north coast; Bodjonegoro (258).

E. J. Klakah (230); province of Besouky; mount Semarou (700).

Form Alexis Stoll. (Pl. XX, 37*a*, *b*).

Stoll, *Suppl. Cramer, bld.* 167, *pl.* 38, *fig.* 3, 3*c* (1790)	Papilio Alexis.
Horsfield, *Cat. Lep. E. I. C.*, *p.* 73, *pl.* 4, *fig.* 1, 1*a* (1828)	Lycaena Aelianus.
„ & Moore, *Ibid.*, I, *p.* 25, *pl.* 1, *fig.* 1, 1*a* (1857)	„ Alexis.
Moore, *Lep. of Ceylon*, I, *p.* 94, *pl.* 38, *fig.* 3, 3*a—b* (1891)	Lampides Aelianus.
Druce, *Proc. Zool. Soc. of London*, 1874, *p.* 106, *pl.* 16, *fig.* 2—4	Cupido Agnata.
Courvoisier, *Jav. Lyc. Tijdschr. v. Ent.*, LV, *p.* 17 (1912)	Lampides Aelianus.

W. J. Batavia (3—14); Buitenzorg (265); W. J. without further indication of place of capture.

C. J. In the vicinity of Touban on the north coast; Srondol; Tjandi (60) (Jacobson).

E. J. Without further indication of place of capture; Tengger mts. (1200) (Jacobson).

Form Cleodus Felder (Pl. XX, 35).

Felder, *Novara Lep.*, *p.* 272, *No.* 334, *Tab.* 34, *fig.* 20—22 (1867)	Lycaena Cleodus.
Semper, *Schm. d. Phil.*, I, *p.* 181, *Taf.* 33, *fig.* 9, 10 (1886—92)	„ „
Druce, *Proc. Zool. Soc. London*, 1895, *p.* 583, *pl.* 32, *fig.* 18	Nacaduba Zebra.
Swinhoe, *Lep. Ind.*, VIII, *p.* 63, *pl.* 654, *fig.* 1, 1*a*, 1*b* (1910—11)	Jamides Cleodus.

W. J. Soukaboumi (600).

C. J.?

E. J. Province of Kedyry, Pouspa (630).

FRUHSTORFER, who possesses both sexes of this variety from E. Java, calls them PARAZEBRA.

In mij opinion these three forms, which SNELLEN regards as three species CELENO Cram., ALEXIS Stoll. and CLEODUS Felder, should be reunited as one species. That they are very nearly related, is shown by the fact that the male genitals of all three varieties are identical. There is a great deal of confusion about these forms; it is said, for instance, that the ALEXIS form is the same as that of the CELENO specimens of the dry season; which is quite untrue, for, not only do such sharply defined seasonal varieties not exist in Java, but moreover I possess various specimens of CELENO found in different parts of Java in the driest months, that in no way differ from specimens collected in various months during the wet season. The differences between the three given in various very elaborate descriptions, I have found upon acurate examination not to exist as such; but on the contrary it became very clear to me by the comparison of many specimens, that we here have to deal with specimens of the same species, which are however in different stages of colour evolution, in which the fading process, peculiar to it, is not equally advanced. The upperside has originally been blue, as still appears so distinctly in the CYANIRIS group; in the form CLEODUS Felder it has survived the most, and the colour may still be described as whitish blue; in the form CELENO Cram. the fading has proceeded further and the colour can only be called bluish white, which often even merges into pure white; in the ALEXIS form this is always the case. On the underside of the primaries, which bear a peculiar marking of white vertical lines also characteristic of L. SATURATA Snell., this process can be observed even more clearly. The ground colour is here, in the form CLEODUS Felder—which, as regards the blue on the upperside is apparently also the oldest—usually bright brown, against which the fine white vertical lines show up distinctly. But in the form CELENO Cram. the ground colour is much faded, its white lines especially at their lower end are often broader, and merge into a sometimes considerably broadened white band along the under edge, which is not yet present in CLEODUS Felder. There is evidently much more white here, and a general fading.

In the form ALEXIS Stoll. all this has greatly increased. These three forms can be easily distinguished, but the mutual differences are clearly seen to be only differences in the stages of the process of fading.

There are some very small specimens of this species. It is also worthy

of notice that in the forms CELENO Cram. and ALEXIS Stoll, that of the second and third vertical lines, counting from the inside, sometimes the one and sometimes the other flows into the vertical line below it, which, however, only causes individual changes in marking. I found the larvae upon *katjangan* (PHASEOLUS spec) of which they devour the buds, and upon *krintjingan* (CRITALLARIA RETUSA L.). They are of the usual LYCAENA form. The young larvae are light green; the full-grown one is dark green, the back light coloured, with a reddish dorsal line, which is here and there somewhat broader; in the full-grown larva there is also a brown subdorsal line, and very small white dots, which the microscope shows to be short white hairs. The pupa is light green, dark green or clay coloured, with darker marbling forming three rows. Both the larvae and pupae differ greatly in colour and shade. Pupae from 3rd, 5th, 7th and 10th of August, produced butterflies on the 7th, 15th, 13th and 17th of the month.

DE NICÈVILLE gives a description of the larva and pupa, which may be reconciled with mine; as a matter of fact it is very difficult to give an accurate description of LYCAENA larvae, owing to the great variety in individual colouring. He found them in Calcutta upon HEYNEA TRIJUGA Rokb. and living in symbiosis with a species of ant, CAMPONOTUS MITIS Smith. Of this symbiosis I have never observed anything. The reproductions of larva and pupa given by SWINHOE do not seem to me to be successful.

8. AMPHISSA Felder. (Pl. XXI, 40*a*, *b*.)

FELDER, *Novara*, *p.* 263, *Tab.* 34, *fig.* 16, 17. . . . Lycaena Amphissa.

This species is unknown to me. The accompanying reproductions are made from specimens collected in Java by FRUHSTORFER. He regards them as the subspecies VARDUSIA.

9. SATURATA Sn. [1]) (Pl. XX, 39*a*, *b*. *c*).

SNELLEN, *Tijdschr. v. Entom.*, XXXV, *p.* 137 (1892) . . Lycaena Saturata.

W. J. Batavia (3—14); Buitenzorg (265); Soukaboumi (600); Patjet (1114); mount Gedeh (1500); vicinity of the Tjiletou or Sandbay (± 150), (VAN BEMMELEN) and of Pelabouan Ratou or the Wijnkoopsbay (± 150).

C. J.?

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[1]) In FRUHSTORFER's opinion there should also be a LAMPIDES PARASATURATA and a LAMPIDES GENNADIUS. I only know these butterflies from the illustrations sent to me, but these, in my opinion, do not give sufficient ground to justify their being taken as separate species.

E. J. Malang (443); (HILLEBRAND); one specimen without further indication of place of capture.

I found this species in Batavia, where it is by no means uncommon, and was then described by SNELLEN in the article quoted above as a new species, which he calls SATURATA, as follows.

Upperside of the ♂ dark blue, the primaries towards the base, and the secondaries also towards the costal margin paler, where the white lines from the underside more or less show through. The costal margin of the primaries is white from the base to beyond the discal area, then equally black; the outer margin black, towards the base not sharply defined, above about 1½ mm. broad, at the outer angle sometimes not reaching further than the fringe line. On the secondaries only the fringe line is black, which, in the direction of the base in all cells is edged with white lines divided by blue scaled veins, along which, in the cells 1 and 2—or only in 1—a black line is again seen, usually edged along the inner border with a double red and white line.

The ♀ on the upperside is dull greyish blue, with a dingy black outer margin of the primaries, and above vein 6 and the discoidal cell a grey-black costal margin of the secondaries. The outer margin of these also is grey-black for the breadth of about 3 mm., towards the base more or less distincly edged with small white or bluish white arches; divided in the middle by similar arches; in cell 2 there is a semi-circular black spot, which towards the base is formed first by a blue and then by a dirty orange-yellow arch. Fringe-line marked in the same way as the ♂.

Upon the clear grey underside the white lines are broad, and clear in colour, the inner border of the primaries only white in cell 1*a*. In this species a striking feature is the very extensive orange border to the black spot at the end of cell 2 of the secondaries, which spreads into cell 3 and 1*c*. The black spot has some silver-green scaling, on both sides, traces of which are still seen in cell 11.

Fringe grey, fine white divisions on the secondaires. Breast, belly and legs white, with black markings on the last.

Nearly related to LYCAENA SUIDAS Felder, *Novara* pl. 34, from the Philippines, but differing from it, as is shown clearly by comparing it with a specimen in my collection, which SNELLEN received from FELDER himself, as in SATURATA the colour of the primaries is more greenish, SUIDAS lacks the black outer margin and the black along a portion of the costal margin which is peculiar to SATURATA, and on the underside of the secondaries in the latter the orange is much more extensive.

In the ♂ the blue on the upperside is often more or less whitish and the

markings on that side along the outer margin of the secondaries much more strongly pronounced in one individual than in another. In SUIDAS they are also stronger. The species is distinguished clearly from ELPIS and KONDULANA by the marking of the white lines on the underside in the two species being different to that of SATURATA which greatly resembles that of CELENO. This makes it difficult to distinguish the ♀ of SATURATA from that of CELENO with absolute certainty; except that the white on the upperside of the ♀ in the former species is usually much more bluish; although in one individual it is much less so than in another. In the collection of FRUHSTORFER there is an abnormal specimen of L. SATURATA, of which the underside of one of the secundaries is abnormally marked.

I found the larvae upon *dawon Brahma* (GUATTERIA MACROPHYLLA BL. var. BRAGMA BL.) *kaworoh* (MILLIETTA SERICEA *W. d. E.*), *touba kebo (id.)*, *touba lalear* (DERRIS ELLIPTICA *Beuth)* and *bebaukean* (?). They are of the common Lycaena form, green, sometimes lightish and grey, sometimes darker and brownish, sometimes also with a reddish tint; with a dorsal line sometimes light brown, at others reddish or very dark, and usually also two simular subdorsal lines. The light brown or clay-coloured pupa is covered with black spots, which form a dorsal and two subdorsal rows. Pupa of April 11th, May 5th and 31st and June 1st, produced butterflies on April 19th, May 12th and June 8th and 9th.

10. ELPIS Godt. (Pl. XXI, *a*, *b*).

GODART, *Enc. Meth.*, IX, *p.* 654, *No.* 125 (1819—23).	Polyommatus	Elpis.
HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 76, *pl.* 1, *fig.* 4 (1828)	Lycaena	„
DISTANT, *Rhop. Mal.*, *p.* 226, *Tab.* 21, *fig.* 25—26 (1882—86)	Lampides	„
DE NICÉVILLE, *Butt. of India*, III, *p.* 161 (1890) . . .	„	„
BINGHAM, *Fauna of Brit. India, Butt.* II, *p.* 407 (1907)	„	„
SWINHOE, *Lep. Ind.*, VIII, *p.* 69, *pl.* 656, *fig.* 1—1*e* (1910—11).	Jamides	„
COURVOISIER, *Jav. Lyc. Tijdschr. v. Ent.*, LV, *p.* 15 (1912)	Lampides	„

W. J. Batavia (3—14); Buitenzorg (265); Soukaboumi (600); Sindanglaya (1074); mount Gedeh (1500); Province of Prayangan (1500); vicinity of Pelabouan Ratou or the Wijnkoopsbay (± 150).

C. J. Magelang (± 500); Province of Tegal (LUCASSEN).

E. J. Malang (443) (HILLEBRAND); Pouspa (630); Tengger mts. (1200) (JACOBSON); Kedyry (64).

The butterfly, in both sexes, is as a rule—although there are smaller specimens—much larger than L. PSEUDELPIS Butl., (KONDULANA Felder) with which it has in common the marking of white lines on the underside. The colour of blue on the upperside of the ♂ is, moreover, less glassy than in that species, and somewhat greenish; while there is a distinct marking along the outer margin of the primaries, which is absent in the PSEUDELPIS. In the ♀ the black or dark grey along the costal margin of the primaries continues much further, often as far as the base of the wing. I have not observed any seasonal variations here, either.

The larva, according to BINGHAM, has been found in British India upon the flowers and seeds of the cultivated cardamon, and upon KOEMPFOERIA PANDURATA. He describes it as "very similar to that of L. CELENO Cram. (ALEXIS Stoll?), but of a pink hue, with well-defined stripes of red dorsally and laterally." The pupa has been found "inside the fruit, or in the cluster of dead flowers above the fruit," it is „smooth, and of a dull yellowish brown, marked with interrupted bands of a darker brown. In shape it is similar to that of L. CELENO Cram."

11. CUNILDA Sn. (Pl. XXI, *a*, *b*).

SNELLEN, *Tijdschr. v. Entom.*, XXXIX, *bld.* 91, *pl.* 1, *fig* 4
(1896) . . . . . Lycaena Cunilda.

This species is described and reproduced by SNELLEN in the article quoted, from a Javan specimen from the collection of STAUDINGER; later on I captured a pair in the Prayangan mountains *in coitu*.

W. J. A ♂ from the vicinity of the Wijnkoopsbay or Pelabouan Ratou on the south coast (± 150); a pair from the Prayangan mts. and 3 ♂ without further indication of place of capture.

C. J.?

E. J.?

SNELLEN notes in regard to this species, that in the colour of the upperside it is related to L. SUIDAS Felder, but in the marking upon the underside to L ELPIS Gdt.

His further description runs as follows: Upperside of the wings of ♂ purple-blue, darker than in ELPIS, and, especially on the primaries, the outer margin also for a third of its length darker, but without the black outer margin to the primaries peculiar to SUIDAS and ELPIS. Upon the secondaries there is along the black fringe line, from the wing tip to vein 4, a row of faintly arched dull black stripes, which are edged outwards with white, towards the base

with a rather paler blue than the ground colour. This is followed in cell 3 by a larger and blacker stripe; in cell 2 a still blacker and larger one, almost round, and from there to the outer angle there are two black stripes divided by a white line. In the ♀ the dark costal margin of the primaries is only hair fine grey, the outer margin is bluntly broken off at vein 4; the narrower under part thus shorter than in ELPIS. The markings of the underside are the same in both sexes, except that in the ♂ the ground-colour is somewhat darker. Here the grey ground is somewhat brighter than in ELPIS, and the white markings sharper, the upper part of the last two lines but one on the primaries more arched. On the secondaries no difference of importance can be discerned. The ventral side and legs as well as fringe the same as in ELPIS.

12. KONDULANA Felder (Pl. XXI, *a*, *b*, *c*, *d*).

FELDER, *Novara*, *Lep.* VII, *S.* 271, *No.* 332, *pl.* 34, *fig.* 6 (1865)	Lycaena Kondulana.
BUTLER, *Trans. Linn. Soc., London*, II, *Ser.* 1, *p.* 547, *pl.* 68, *fig.* 7, 8) (1877)	Lampides Pseudelpis.
DISTANT, *Rhop. Mal.*, *p.* 227, *Tab.* 20, *fig.* 27, 28 (1882—86)	„ Elpis. var. Pseudelpis.
DE NICÉVILLE, *Butt. of India*, III, *p.* 172 (1890) . .	Lycaena Kondulana.
„ „ *J. Bombay, N. H. Soc.*, XXXVI, *pl.* 5, *fig.* 25, 26 (1895)	Lampides Lacteata.

W. J. Batavia (3—14); Buitenzorg (265); Tjampea (160).

C. J.?

E. J. One specimen, without further indication of place of capture.

SNELLEN notes with reference to this species, that the blue on the upperside of the ♂ is much more glassy than is the ♂ of the preceding species, and with regard to the ♀, that the colour of the upperside is much bluer, and the black patch in cell 2 of the secondaries is always larger. I may remark here that the glassiness of the blue of the ♂ is however not at all distinct in many specimens, and that in some ♀ the blue of the upperside is much faded, that further the underside in both sexes is the same, and that very small specimens of this species are found. He also lays stress upon the fact, that PSEUDELPIS Butl. (KONDULANA Felder) is by no means a variety of ELPIS Gdt., but a distinct species. He considers BUTLERS illustration to be very imperfect, although the shade of blue is well caught.

The above quoted LACTEATA of DE NICÉVILLE is according to SNELLEN

this species, but his PSEUDELPIS, in "Butt. of India" is no other than ELPIS. FRUHSTORFER considers PSEUDELPIS as the race of KONDULANA of the Malay archipelago, and *Lacteata* as that of Ceylon. The Java variety he takes to be the subspecies *Sydra*.

The differences between this species and L. ELPIS Gdt. have been already discussed in the description of the latter.

The butterflies are very common in Batavia, both in the rainy season and in Sept. and Oct. that is in the middle of the dry season. Moreover I found the larvae in the end of Aug. and in Nov. The larvae eat the young red leaves and also the flowers and seeds of the *nam-nam* (CYNOMETRA CAULIFLORA L.) They are dark brown of various shades, with a broad, light, toothed dorsal stripe; the ventral side light brownish grey. The black head retires behind the first segment. The small pupa is light brown, also varying in shade; with black dorsal line and marbling, attached to a leaf by a fine girdle-thread. Larvae from Jan. 13th and Aug. 19th produced butterflies on Jan. 19th and Aug. 21st.

13. KANKENA Felder (Pl. XXI, 44).

FELDER, *Verh. Zool. Bot. Ver.*, XII, *S.* 481, *No.* 106 (1862)	Lycaena Kankena.
„ *Novara Lep.*, *S.* 270, *No.* 331, *pl.* 34, *fig.* 37 (1864)	„ „
DRUCE, *Proc. Zool. Soc. of London*, 1873, *p.* 349, *pl.* 33, *fig.* 6	Cupido Caerulea.
„ „ „ „ „ „ 1895, *p.* 582, *pl.* 32, *fig.* 19	Lampides „
MOORE, *Ann. & Mag. of N. H.*, IV, *S.* 20, *p.* 341 (1877)	„ Coruscans.
DE NICÉVILLE, *I, Bombay N. H. S.*, VI, 3, *p.* 367, *pl. F* 15 (1891)	„ Bochides.
SWINHOE, *Lep. Ind.*, VIII, *p.* 62, *pl.* 653, *fig.* 4, 4*a*, 4*b* (1910—11)	Jamides Caerulea.

This species appears to be rare. I possess only one ♂ from Buitenzorg (265) in W. J.; FRUHSTORFER possesses them from Lawang (54?) in E. J. The underside is much darker than given in Felder's reproduction, and in this respect corresponds entirely to a ♂ in my possession from East Borneo. It would seem, therefore, that the darker colour of the underside is characteristic of this species, at all events of the male. In general appearance it greatly resembles that of L. KONDULANA Felder, but the glossy blue is of a much darker shade; darker even than in SUIDAS, and approaching nearest to that of CUNILDA, which however is not so glossy.

14. Osias Röber (Pl. XXI, 45*a*, *b*).

Röber, *Iris I, S.* 56, *Taf.* 5. *fig.* 17 (1886). . . . . Plebejus Osias.
Snellen, *Tijdschr. v. Ent.*, XXXIII, *p.* 298 (1889). . . . Lycaena „
Semper, *Schm. d. Phil.*, I, *S.* 179 (1886—92) . . . . . Lampides „

There is a great difference in size amongst the specimens of this species.
W. J. One specimen without further indication of place of capture.
C. J. Bodjonegoro (258); Dander (± 30); both in the Province of Rembang.
E. J.?

15. Lucide de Nic. (Pl. XXI, 46).

L. de Nicéville, *Journ. A. S. Beng., I*, XIII, *pl.* 2, *p.* 33,
No. 29, *pl.* 5, *fig.* 3 ♂ (1894) . . . Lampides Lucide.
„ & L. Martin, *A list of the Butterflies of*
Sumatra, pag. 460 (1895) . . . . . „ „

Fruhstorfer found this butterfly in W. Java. The illustration is made after this specimen.

16. Abdul Dist. (Pl. XXI, 47).

Distant, *Rhop. Mal., p.* 456, *pl.* 44, *fig.* 22 (1886). . Lampides Abdul.
de Nicéville & Martin, *A list of the Butterflies of*
Sumatra, p. 460 (1895) . . . . . „ „
„ *Butt. of India*, III, *p.* 174 (1890) . . . „ Markata.
Röber, *Iris*, 1886, *S.* 54, *Taf.* 4, *fig.* 14 . . . . . Plebejus Insularis.
„ *Entom. Nachr.*, XXIII, *S.* 100 (1897) . . . . „ Daonides.

Fruhstorfer obtained this species in West Java. The illustration is made from his specimen. He assumes for it the subspecies Daonides.

17. Bochus Cram. (Pl. XXI, 48*a*, *b*).

Cramer, *IV, bld.* 210, *pl.* 391 *C. D.* (1782). . . . . Papilio Bochus.
Fabricius, *Ent. Syst.*, III, 2, *p.* 288, *No.* 103 (1793). . Hesperia Plato.
Donovan, *Ins. of India, pl.* 45, *fig.* 2 (1800) . . . . Papilio „
Butler, *Cat. Diurn. Lep. of Fabr., p.* 166, *pl.* 2, *fig.* 3 (1870) Lampides „
Distant, *Rhop. Mal., p.* 222, *Tab.* 21, *fig.* 16, 19 (1882—86) Jamides Bochus.
Staudinger, *Exot. Schm., S.* 272, *Tab.* 94 (1884—88) . Lycaena „
de Nicéville, *Butt. of India*, III, *p.* 157 (1890) . . . Jamides „
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 398 (1907) . Lampides „
Swinhoe, *Lep. Ind.*, VIII, *p.* 58, *pl.* 652, *fig.* 3, 3*a*, 3*b* (1910—11) Jamides „

There are larger and smaller specimens, but I see no difference between specimens from W. J. and from E. J. The underside of the ♂ differs from that of the ♀ only in being somewhat darker.

W. J. Batavia (3—14); Depok (95); vicinity of the Wijnkoopsbay or Pelabouan Ratou (± 150).

C. J. Touban on the north coast; Province of Tegal.

E. J. Banyouwangy.

18. Aratus Cram. (Pl. XX, 38*a*, *b*).

Cramer, *Pap. Ext.*, IV, *pl.* 365, *fig. A. B.* (1782) . . .	Papilio Aratus.
Druce, *Proc. Zool. Soc., London*, 1895, *p.* 584	Lampides „

The accompanying illustrations of both sexes are made from specimens captured by Fruhstorfer in E. J. The species is unknown to me. He considers it to be a subspecies, which he calls Tryphiodorus Cram.

19. Kerriana Dist. (Pl. XXI, 49*a*, *b*).

Distant, *Ann. and Mag. of Nat. Hist.*, V, *S.* 17, *p.* 253 (1886)	Nacaduba	Kerriana.
„ *Rhop. Mal.*, *p.* 455, *Tab.* 42, *fig.* 12 (1886) .	„	„
Druce, *Proc. Zool. Soc. of London*, 1895, *p.* 577, *pl.* 32, *fig.* 15	„	Lugina.
Bingham, *Fauna of Brit. Ind., Butt.* II, *p.* 384 (1907) .	„	Kerriana.
Swinhoe, *Lep. Ind.*, VIII, *p.* 76, *pl.* 657, *fig.* 2, 2*a*, 2*b* (1910—11).	„	„

W. J. In the Leiden museum there is a ♂ captured by S. Muller in the Province of Krawang.

C. J. Province of Madioun (± 500).

E. J.?

This species would therefore seem to be rare. On the underside both sexes are alike.

20. Pavana Horsf. (Pl. XXI, *a*, *b*, *c*, *d*).

A good deal of confusion exists between this species and the following one, as they considerably resemble one another, and are both subject to a process of colour evolution, which, especially in the female, leads to great individual variations, so that the colour can only to a very limited extent be taken as a specific characteristic. Not only that the colour of the upperside in the ♂ is sometimes more bluish and at others more brownish, but on the underside also, although otherwise the same in both sexes, the colour is more

or less brown, in the former case being dull, so that the markings upon it are much less distinctly perceptible than in other specimens. As regards the extent of the white on the upperside, also, there is great variety amongst them, especially in the ♀. Both species are only to be properly distinguished by the plan in which the vertical white lines on the underside of the primaries are arranged, and where this is not clearly noted,—as is the case in the older writers,—the species described by them cannot well be recognised.

Even Bingham, in this respect, is very ambiguous, especially in his illustrations.

L. Pavana Horsf. and L. Atratus Horsf. differ in this respect in the same way as L. Celeno Cram. and L. Elpis Gdt.; particularly as regards the lines placed most inwards, in which the same individual variations occur as in L. Celeno Cram. which may give size to confusion. In L. Pavana Horsf. most inwards, there are two short vertical lines beside one another, under which is a somewhat longer one, while frequently one or other of these upper lines is more or less merged in the lower line. More towards the outer margin these are followed by another long line, and then a short, somewhat curved one. In L. Atratus Horsf. two such longish lines beside one another are placed most inwards and are followed, towards the outer margin, by two short lines, beneath which is a rather longer one while, again, now the one and then the other of the upperlines merges more or less into the line beneath it.

Whether Felder's L. Macrophtalma is the same as L. Pavana Horsf. cannot be ascertained, owing to the indistinctness of both his description and his illustration; it is certain that I have never seen such a butterfly from Java, which showed the large eye-spot on the wing after which Felder has named his species and which appears very distinctly in his drawing.

For the same reason, Snellen does not venture to express himself definitely about the L. Beroe of Felder and of Distant.

I feel obliged, however to include in L. Pavana Horsf. the species described by Snellen as Subperusia, although he himself points out that it resembles Pavana more than Perusia. Upon a close study of my specimens which Snellen thus determined, I was unable to distinguish them from Pavana. All the distinguishing characteristics given by Snellen are also found in specimens of Pavana, but this is not always the case in every particular; as already said, there is great individual variety in this respect. Some ♂ are dark blue, others brown, the primaries of the ♂ are sometimes pointed, but not always, sometimes they are more rounded. This last is the most important difference that Snellen points out between Pavana and Subperusia, but I take it only as an individual variation; especially as it is a quite independent feature; for instance, the greater blueness of the colour by no means, as Snellen

says, invariably goes together with the greater pointedness of the wing point.

In this connection we are reminded of the difference correctly pointed out by WALLACE, although he interpreted it quite fantastically, in the form of the primaries between individuals of the same species inhabiting Java and Celebes. Moreover in various butterflies, such as in the Lycaenidae LYCAENA QUADRIPLAGA Sn. and ALLOTINUS HORSFIELDI Moore, the shape is more rounded in the ♀ than in the ♂, which also points to a different stage in the process of form development, but does not therefore mean a specific difference. The species, as is also shown by the variation of colour especially in the ♀, is clearly in a state of differentiation, which is further advanced in some individuals than in others. Moreover in the matter of the greater or less width of the greyish-black costal margin of the ♀, the presence or absence of a black spot above the cross vein on the upperside of the primaries, and the lighter colour of the underside, there are undoubtedly differences in the individuals, but they are by no means so regularly connected with eachother as to justify a separation into two species. I, therefore, requested MR. VAN EECKE, conservator in the National Museum of Natural History in Leiden, who has made a special study of the subject, to examine the genitals of these species, and he found that the structure of the genitals of all my 10 ♂ is the same, but that differences occur in the details, which points to the same conclusion. The ♀ specimens of this species are not suitable for an examination of this kind.

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 77, *No.* 12 (1882). Lycaena Pavana.
MARSHALL & DE NICÉVILLE, *Butt. of Ind.*, III, *p.* 145, *pl.* 26, *fig.* 182 (1890) . . . . . Nacaduba „
SNELLEN, *Tijdschr. v. Ent.*, XXXIX, *p.* 93 (1898) . . Lycaena Subperusia.
SWINHOE, *Lep. Ind.*, VIII, *p.* 78, *pl.* 657, *fig.* 3, 3*a*, 3*b*, 3*c* (1910—11). . . . . Nacaduba Pavana.

W. J. Batavia (3—14); Buitenzorg (285); Depok (95); mount Gedeh; mount Salak (780); vicinity of the Wijnkoopsbay or Pelabouan Ratou and Tjiletou or the Sandbay on the south coast (± 150).

C. J.?

E. J. Mount Semarou (800).

21. ATRATUS Horsf. (Pl. XXI, *a*, *b*).

In this species, to which the above remarks also apply I should include the L. PERUSIA of Felder, which SNELLEN considers as a separate species, for neither from his description, nor by comparison of the specimens in my col-

lection determined by SNELLEN as L. PERUSIA Feld. can I find any constant difference between this and L. ATRATUS Horsf. FELDER's illustration of his L. PERUSIA is also by no means clear. But DRUCE's ALUTA is certainly this species, and also SWINHOE's ATRATUS. In this species, the underside is again the same in both sexes.

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 78, *No.* 23 (1828) . .	Lycaena	Atratus.
FELDER, *Sitz. Ber. d. Wiener Acad.*, XL, *S.* 458 1880) .	„	Perusia.
„ *Novara, Lep.*, *S.* 274, *No.* 338, *Tab.* 34, *fig.* 4 (1887)	„	„
DRUCE, *Proc. Zool. Soc., London*, 1895, *p.* 579, *pl.* 32, *fig.* 13, 14	Nacaduba	Aluta.
SWINHOE, *Lep. Ind.*, VIII, *p.* 80, *pl.* 658, *fig.* 3—3*c* (1810—11)	„	Atrata.

W. J. Batavia (3—14); Buitenzorg (265); Soukaboumi (600); Sindanglaya (1074); Patjet (1114); mount Salak (780); mount Megamendoung (1300); Prayangang mountains (1500—1800); vicinity of Pelabouan Ratou or the Wijnkoopsbay (± 150).

C. J. Touban on the north coast.

E. J. Kedyry (64); Banyouwangy, Pouspa (630); Tengger mts. (700).

The species is common in Java. I see no difference between specimens from W. J. and E. J.

Larva and pupa are pictured by MOORE from Ceylon, and also by SWINHOE. The former is said to live on ERUBELIA ROBUSTA, and is described as follows:

The back elevated and the segments most distinctly defined, the anal segment is flattened, the back forms a distinct ridge, the colour is green, but there is a purple line along the ridge of the back; the other segments are also edged with the same colour. The head is small, amber-coloured, with a darker border. The pupa is short and stout, constricted slightly between the thorax and the abdomen, and has slight traces of a ridge along the back. In colour it is a dingy greyish-brown, powdered with black. There is an interrupted dark band along the middle of the back, and also spots of blackish on the abdominal segments and just beyond the wing covers and the sides of the thorax. It is smooth, and only fastened at the tail, parallel to the leaf to which it is attached.

I once bred a butterfly, determined by SNELLEN as L. PERUSIA, and made the following short notes concerning it. The larva upon very young leaves of *ramboutan* (NEPHELIUM LAPPACEUM L.). Pale pink, with a darker dorsal line, and a line on the border of the ventral side of the same colour, under this a faint white line. Larva and pupa of the usual LYCAENA form. The pupa of Dec. 4th produced a butterfly on the 11th of the month.

22. Viola Moore (Pl. XXI, 52*a*, *b*).

Moore, *Ann. and Mag. of Nat. Hist.*, IV, *S.* 20, *p.* 340 (1877) Lampides Viola.
„ *Lep. of Ceylon*, I, *p.* 89, *pl.* 38, *fig.* 1, 1*a*, 1*b* (1881) Nacaduba „
de Nicéville, *Journ. Asiat. Soc. of Bengal*, LV, 2, *p.* 267, *pl.* 17, *fig.* 12 (1886) . . . . . „ „
Semper, *Schm. d. Phil.*, I, *S.* 175 (1886—92). . . . . „ „
Bingham, *Fauna of Brit. Ind., Butt.* II, *p.* 398 (1907) . . „ Hermus.
Swinhoe, *Lep. Ind.*, VIII, *p.* 87, *pl.* 659, *fig.* 5, 5*a*, 5*b* (1910—11) „ Viola.

W. J. Bavavia (3—14); Depok (95); mount Salak (780); Sukabumi (600).
C. J.?
E. J.?
The ♀ of this species seem to be rare.

23. Berenice Herr.—Sch. (Pl XXI, 53*a*, *b*).

Herrich—Schaeffer, *Ent. Zeitung*, XXX, *S.* 74 (1869). Lycaena Berenice.

Fruhstorfer caught this species in West Java. The accompanying illustration are made from his specimen.

24. Usta Distant (Pl. XXI, 54).

Distant, *Rhop. Mal.*, *p* 454, *Tab.* 44, *fig.* 1 (1886) . . . . Zizera Usta.
de Nicéville, *Butt. of India*, III, *p.* 51 (1890). . . . . Una „
Druce, *Proc. Zool. Soc., London*, 1895, *p.* 529. . . . . „ „

The ♂ of our illustration was caught by Fruhstorfer in West Java.

25. Boeticus L. (Pl. XXI, 56*a*, *b*, *c*, *d*).

Linnaeus, *Syst. Nat. Ed. XII*, I, 2, *p.* 739, *No.* 226 (1767) Papilio Boeticus.
Hübner, *Samml. Eur. Schm., Taf.* 74, *fig.* 373—75, *p.* 56 (1796—1805). . . . . „ „
Distant, *Rhop. Mal.*, *p.* 230, *Tab.* 20, *fig.* 8 (1882—86) Polyommatus „

W. J. Batavia (3—14), and even upon the small coral island Edam; Buitenzorg (265); Sindanglaya (1074); Prayangan mts. (± 1700).
C. J. Province of Tegal (Lucassen); Magelang (500); Touban, on the north coast.

E. J. Tengger mts. (1777); Malang (443).

This species is very common in Java. The specimens differ very much in size, without the season in which they were caught having any influence upon it. According to SNELLEN the ♂ cannot be distinguished from European specimens but the ♀ from Java is lighter and more silvery-blue in colour on the upperside of the primaries. I can see no difference between specimens from W. J. and E. J. The underside is the same in both sexes.

The larva lives inside the pods of the common PISUM SATIVUM L. as well as the pods of *klongkang* (PSOPHOCARPUS TETRAGONOLOBUS D. C.), *katjang toenggak* and *pandjang* (VIGMA CATJANG *Walp*) and *katjang arab* (PHASEOLUS LUNATUS L.) where it feeds upon the inside of the pod, and like the pupa, it is of the usual Lycaenid shape. It is pale red-brown, with black marbling and a dark dorsal line; also sometimes reddish green with black stigmata.

According to DE NICÉVILLE, at Calcutta the larva lives upon the flowers and inside the pods of CROTOLARIA STRIATA D. C., and in Europe upon the flowers of CROTOLARIA CAPENSIS and at Calcutta in symbiosis with three species of ants, CAMPONOTUS RUFIPES Drury, (SYLVATICUS F.), subspecies COMPRESSUS F., TAPINOMA MELANOCEPHALUM F. and PRENOLEPIS OBSCURA Mayr (var. CLANDESTINA Mayr). Although I often found the larvae in Java, I never observed this symbiosis.

The pupa is greyish green, or yellowish brown, with small black spots. A pupa of April 14th yielded a butterfly on April 23rd. As in the pods the larva lives with the larva of L. CNEJUS F. which resembles it very closely; this gave rise to a good deal of confusion in observations.

26. GLAUCA Sn. (Pl. XXI, 55).

SNELLEN, *Tijdschr. v. Ent.*, XXXV, *p.* 142 (1892) . . . Lycaena Glauca.

W. J. Prayangan mts. (1600).

C. J.?

E. J.?

This species is minutely described by SNELLEN, in the above quoted work, from a fresh ♂ specimen which I caught; I give an illustration of it here.

The particulars of this species, as noted by SNELLEN, are as follows: The wings correspond in form to those of the common European LYCAENA; the colour of the upperside, of the five closely related species, is in GLAUCA the most greyish, with only a faint silky sheen. Towards the outer margin of the wings the ground is somewhat darker. The fringe-line is blackish grey, at the inner angle of the secondaries there is no indication of black spots visible. The fringe is grey with lighter outer half, on the secondaries almost

white. On the underside the ground colour is light grey, fairly pure, the markings fine greyish white. On the primaries the traces of a light-rimmed patch may be still seen, in the middle cell before the marking on the cross vein, which really consists of two somewhat waved greyish white lines, between which the ground is slightly darker, with another greyish white middle line. Here upon follow two waved lines with a paler one between them, the first of which is continued to vein 1, the second only to vein 3, and outwards does not protrude much in the cells 3—5, as in ARDATES. On the secondaries the marking is of the same kind, but more elaborate, and along the outer margin runs a line slightly pointedly waved and on the secondaries faintly double, which has a somewhat darker border. The small black spot in cell 2 of the secondaries is towards the base distinctly pointed in the middle, without any yellow-red or silver, and in cell 1*c* another black point may be seen with a few blue-silver scales. Fringe line dark grey, towards the base bordered by greyish white. Fringe greyish white, darkly divided.

27. DATARICA Sn. (Pl. XXI, 57*a*, *b*).

SNELLEN, *Tijdschr. v. Ent.*, XXV, *p.* 160 (1892) . . . Lycaena Datarica.

W. J. Megamendoung and Prayangan mts. (± 1600).
C. J.?
E. J.?

This species is minutely described by SNELLEN in the above mentioned article, from 11 ♂ and 1 ♀ which I caught.

SNELLEN describes it thus. In the ♂ of this species the upperside is of a more vivid and darker blue than in GLAUCA, with no further markings, towards the outer margin somewhat darker and duller without black spots at the inner angle of the secondaries, the outer margin of which shows a trace of a tail there at the end of vein 2. The ♀—only one specimen of which is known—is pale purple-blue on the upperwings, with a broad dull black outer margin on the primaries, and a dark grey costal margin on the secondaries, dark veining and a grey-brown curved row of lunules of the same colour behind it in the cells; the spot in cel 2 is rusty black, on the underside the ground colour is a clear grey, in the ♀ even whitish, which is somewhat darker towards the bases of the wings, where it is slightly powdered with a faint grey-green; the markings consist of spots somewhat darker than the ground, and more clearly marked than in GLAUCA, with a greyisch white border; the curved row of lunules behind the spot on the cross vein is continued to vein 1 on the primaries, though not very distinctly; the spots in cells 1*a* and 2 are almost straight under

those in cell 3, not in front, as in ARDATES; moreover those in cells 3 and 5 do not protrude much outwards as in ARDATES. Markings and black spot in cel 2 of the secondaries are the same as in GLAUCA: fringe-line dark grey, edged fine greyish white. Fringe grey, on the underside somewhat lighter than the wings, with a faint darker line over the root.

It is not impossible that NACADUBA ALUTA which DRUCE has described in *Proc. Zool. Soc., London*, 1895, *p.* 578, with an illustration on plate XXXII, should be included in this species. It is true that it has a tail, and DATARICA has none, and that while the size corresponds, the colour, as shown in the illustration referred to does not correspond to that of DATARICA. At the same time I must here remark that SNELLEN calls the colour of the upperside of the ♂ dark blue, while in all my ♂ specimens it is distinctly dark brown. Is it possible that in specimens which have been kept for a long time the colour becomes darker?

28. ARDATES Moore. (Pl. XXI, 58).

MOORE, *Proc. Zool. Soc. of London*, 1874, *pl.* 57, *fig.* 1 . Lycaena Ardates.
MARSHALL & DE NICÉVILLE, *Butt. of India*, III, *p.* 153, *pl.* 27, *fig.* 185 ♂ (1890) . . . . . Nacaduba „
BINGHAM, *Fauna of Brit. Ind., Butt.* II, *p.* 391 (1907) . „ „
SWINHOE, *Lep. Ind.*, VIII, *p.* 84, *pl.* 659, *fig.* 2, 2*a*, 2*b* (1910—11) . . . . . „ Noreia.

W. J. Batavia (3—14); Depok (95); Buitenzorg (265).
C. J. Touban, on the north coast; Bodjonegoro (258).
E. J. Without further indication of place of capture.

The many specimens which I procured in Java are all tailless, and in this respect agree with the above mentioned illustration by MOORE, but not with his description of ARDATES as it mentions small tails on the secondaries. DE NICÉVILLE calls this species the tailless form of ARDATES; BINGHAM is of the same opinion, but SNELLEN does not agree with this, and therefore suggests for this species the name SUBARDATES. For reasons which I have explained in the Introduction, I do not share SNELLEN's opinion in this matter, and have therefore restored the name of *Ardates* to this species. The sexes do not differ from one another.

29. DONINA Sn. (Pl XXI, 59).

SNELLEN, *Tijdschr. v. Ent.*, XLIII, *bldz.* 262 (1901). . . Lycaena Donina.

W. J. Vicinity of the Wijnkoopsbay or Pelabouan Ratou on the south coast (± 150).

C. J.?

E. J.?

I have only caught one ♂ of this species. SNELLEN correctly distinguishes this as a separate species from the also tailless species NACADUBA DANE of DE NICÉVILLE, a specimen of which DE NICÉVILLE sent him for comparison. In the article referred to above he describes the new species minutely.

He description runs as follows: This butterfly is more powerfully built than the two preceding species. The secondaries show no traces of a tail. On the other hand their inner angle on the upperside is pretty strongly hirsute. The ♂ is dark purple-blue like that of Ardates with a not very distinct thick blackish brown grey fringe line, and a trace of a darker spot by the somewhat pointed inner angle of the secondaries. The ♀ has a greyish brown upperside with a slightly blue powdered basal area of the wings: the dark spot near the outer margin of cell 2 of the secondaries is more distinct than in the ♂, their inner angle blunter, but the hairs are long. The underside distinguishes DONINA clearly from the three preceding closely related species, as the colour is clay-yellow, in the ♂ slightly greyish, especially on the secondaries; also in the ♂ the base of the primaries is thickly powdered with black-grey. In front of the spot upon the cross vein of the primaries, which, like the other markings, is edged with greyish white, another fainter one can be seen in the middle cell, the curved row of lunules is fairly straight, retains the same direction to about vein 1, and consists of pretty distinctly separated spots; along the outer margin runs a double row of grey spots. On the secondaries the spots are less clearly separated, the outer margin is marked by grey dots in the cells, edged toward the base by lunules; in cell 2 there is a round coal black spot, which toward the base has a dark yellowochre lunule, and in the ♀ the outer margin from vein 2 to the inner angle is edged with white, before the fine black fringe line which is otherwise the same in both sexes; at the inner angle another small black spot. The fringe is blackish brown grey, in the ♂ especially, above not differing much from the colour of the fringe line. Thorax, abdomen and legs are covered with light grey hairs. NORA Felder, which also has a clay yellow underside to the wings, is less powerfully built, and has a long tail at the end of vein 2 of the secondaries, the inner angle of which has not the same long hairs. Comparing it with a ♂ of NACADUBA DANA de Nic., sent to SNELLEN by DE NICÉVILLE, he found that the secondaries of DANA are also tailless, the inner angle also hairy, but not rectangular, the blue of the upperside lighter, duller and more greyish, as in the European L. SEMIARGUS v. Rotth.; the fringe-line fine, distinct and black, and the fringe brownish. The underside is brownish grey, the markings, especially the form of the

bended-row of the wings, like that of NORA, and at the end of cell 2 of the secondaries there is a small black spot without silver scales, in the inner angle another smaller one. Of the ♀ I possess only a specimen from Celebes, which is somewhat browner on the upperside than the Javan specimen but on the underside corresponds to it entirely. I am not so convinced as SNELLEN that this species is really a different one to DANA.

30. NORA Felder (Pl. XXI, 60*a*, *b*).

FELDER, *Sitz. Ber. d. Wien. Akad.*, XL, *S.* 458, *No.* 37 (1860)	Lycaena	Nora.
„ *Novara*, *Lep.*, *S.* 275, *Taf.* 34, *fig.* 34 (1867). .	„	„
DISTANT, *Rhop. Mal.*, *p.* 220, *Tab.* 20, *fig.* 13, 14 (1882—86)	Nacaduba	Aluta.
BINGHAM, *Fauna of Brit. Ind.*, *Butt.* II, *p.* 391 (1907) . .	„	Ardates.
SWINHOE, *Lep. Ind.*, VIII, *p.* 82, *pl.* 659, *fig.* 1, 1*a*, 1*b* (1910—11).	„	Nora.
COURVOISIER, *Tijdschr. v. Ent.*, LV, *bldz.* 17 (1912) . . .	„	„

W. J. Batavia (3—14); Mr. Cornelis (20); Buitenzorg (265); Patjet (1119); (JACOBSON); Prayangan mts. (1600); Vicinity of the Wijnkoopsbay or Pelabouan Ratou on the south coast (± 150).

C. J.?

E. J.?

31. ANCYRA Felder (Pl. XXI, 61*a*, *b*).

FELDER, *Sitz. Ber. d. Wien. Akad.*, XL, *S.* 457, *No.* 36 (1860)	Lycaena	Ancyra.
„ *Novara*, *Lep.*, *S.* 276, *Tab.* 34, *fig.* 5 (1867) .	„	„
ELWES, *Proc. Zool. Soc. of London*, 1892, *p.* 121, *pl.* 44, *fig.* 6	Nacaduba	Aberrans.
BINGHAM, *Fauna of Brit. Ind.*, *Butt.* II, *p.* 395 (1907)	„	Ancyra.
SWINHOE, *Lep. Ind.*, VIII, *p.* 86, *pl.* 659, *fig.* 4, 4*a*, 4*b* (1910—11).	„	„

W. J. Prayangan mts.

C. J. Touban on the north coast.

E. J. Tengger mts. (± 1600); mount Semarou (700).

The ♀ show some individual differences of marking on both sides; in some the white on the upperside of the primaries is mixed with blue in a more or less degree. There is a difference in size between individuals, but I find no difference between those from W. J. and from E. J.

32. Malaya Horsf. (Pl. XXI, *a*, *b*, *c*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 70, *No.* 4 (1828). .	Lycaena	Malaya.
Felder, *Sitz. Ber. d. Wien. Akad.*, XL, *S.* 459, *No.* 43 (1860)	„	Strongyle.
„ *Novara*, *Lep.*, *S.* 278, *Tab.* 34, *fig.* 32, 33 (1867)	„	„
Moore, *Lep. of Ceylon*, I, *p.* 71, *pl.* 34, *fig.* 3, 3*a*, 3*b* (1881)	Megisba	Thwaitesi.
Distant, *Rhop. Mal.*, *p.* 457, *pl.* 44, *fig.* 4 (1882—86)	„	„
Elwes, *Trans. Ent. Soc. of London*, 1888, *p.* 375, *pl.* 11, *fig.* 1	„	Malaya.
Bingham, *Fauna of Brit. India*, *Butt.* II, *p.* 313 (1907)	„	„
Swinhoe, *Lep. Ind.*, VII, *p.* 228, *pl.* 627, *fig.* 1—1*d* (1905—10)	„	„

Moore separated this species as a special genus Megisba, in which he has been followed by later writers. Snellen, however, rightly considers that there is not sufficient ground for this, as it differs only in colour, while it corresponds completely to other Lycaenae in other respects. According to de Nicéville in different districts there exist tailed and tailless specimens; in Java only the former. This is true, although the tails are very short, and in most of my specimens they have been lost. There is considerable difference in size amongst individuals.

W. J. Batavia (3—14); Depok (95); Buitenzorg (265); Tjampea (160).

C. J. Touban on the north coast; Bodjonegoro (258).

E. J. Kedyry (64).

The small butterfly greatly resembles L. Hylax F. in colour, but can easily be distinguished from it. Those with a weakness for mimicry theories have a good opportunity for applying it here, and exercising their imagination upon it; for others it forms a remarkable illustration of how in the course of the process of colour evolution the same road is sometimes traversed by different species. When these species have reached about the same stage in the evolutionary change of form, there will naturally be a great similarity in colour and markings between them. The peculiar black spots on the underside of the secondaries are here obviously of the same kind, and therefore of the same origin; they indicate thus very clearly a similar progress in the evolution of both species.

Larva and pupa are illustrated by Moore for Ceylon. The former is said to live on Sapindaceae. I found the larva upon a plant wich is called *toelang ajam* in Batavia, and at Buitenzorg *lamboutang*, and which was determined for me as Schmidelia fulvinervis *var* montana, a plant which also belongs to the Sapindaceae. It is of the ordinary Lycaenid shape, light green much mixed with white, with a faint darker dorsal line, and yellow-brown head. It changes into a small almost colourless Lycaena pupa.

33. Strabo F. (Pl. XXII, *a*, *b*, *c*).

Fabricius, *Ent. Syst.*, III, 1, *p.* 387, *No.* 101 (1793)	Hesperia Strabo.
Horsfield, *Cat. Lep. E. I. C.*, *p.* 82, *No.* 17 (1820)	Lycaena Kandarpa.
Herr.—Sch., *Stett. Ent. Zeit.*, XXX, *S.* 74, *Tab.* 4, *fig.* 20 ♀ (1869)	„ Platissa.
„ *Exot. Schm.*, II, *fig.* 122 (♀) (1869) . .	„ „
Distant, *Rhop. Mal.*, *p.* 224, *Tab.* 21, *fig.* 8, 14 (1882—86)	Catochrysops Strabo.
Bingham, *Fauna of Brit. India*, *Butt.* II, *p.* 411, *pl.* 19, *fig.* 143 (1907)	„ „
Swinhoe, *Lep. Ind.*, VIII, *p.* 47, *pl.* 650, *fig.* 3—3*d* (1910—11)	„ „

W. J. Batavia (3—14); Depok (95); Buitenzorg (265).

C. J. Bodjonegoro (250); Dander, in the Province of Rembang (30); Touban, on the north coast.

E. J. Malang (443).

Form Lythargyria Moore (Pl. XXII, *a*, *b*).

Moore, *Ann. and Mag. of Nat. Hist.*, IV, *S.* 20, *p.* 340 (1877)	Lampides Lithargyria.
Snellen, *Tijdschr. v. Ent.*, XXI, *bld.* 18 (1878) .	Cupido Kandarpa.
Moore, *Lep. of Ceylon*, I, *p.* 91 (1881)	Catochrysops Lithargyria.
Semper, *Schm. d. Phil.*, I, *S.* 185 (1886—92). .	„ „
de Nicéville, *Butt. of India*, III, *p.* 178 (1890) .	„ „
Swinhoe, *Lep. Ind.*, VIII, *p.* 48, *fig.* 1, 1*a* (1910—11)	„ „

W. J. Prayangan mts. (1850); Buitenzorg (265); Soukapoura (70).

C. J.?

E. J.?

These two forms also, I consider, should be united. In fact Snellen as well as Moore and de Nicéville regard this as very probable. Later writers also take Lithargyria Moore only as a variety of Strabo F.; the word variety is however only a phrase, and valid grounds for this opinion are not given. I have now, as explained in the Introduction, reason to think that I have found them. The underside is the same in both sexes.

The larvae which are repeatedly found on *kaljangan* (Phaseolus *Spec.*) and *katjang goudé* (Cajanus indicus Spreng) are of the usual Lycaenid shape, varying in colour through different shades of red-brown to green, with a light

or whitish peculiar marking upon the back, which is divided in two by a dark dorsal line, which line is somewhat broadened in its most anterior portion; there are sometimes also two subdorsal lines. The pupa is of the usual form, and shows a great deal of black marbling upon a brownish or greenish ground.

As regards the pupae I must mention that in my descriptions of the pupae which produced LITHARGYRIA, the presence of a large round black spot exactly at the boundary between thorax and abdomen is always noted, while in my descriptions of the pupae of L. STRABO F. there is never any mention of this spot. This should, therefore, be further examined. Pupae of May 4th, July 14th, July 17th and October 7th produced butterflies upon May 11th, July 22nd, July 25th and Oct. 14th.

34. CNEJUS F. (Pl. XXII*a*, *b*, *c*, *d*).

FABRICIUS, *Ent. Syst. Suppl.*, *p.* 430 (1798)	Hesperia Cnejus.
HERR.-SCH., *Stett. Ent. Zeit.*, XXX, *S.* 73, *Taf.* 4, *fig.* 18 (1869)	Lycaena Samoa.
„ *Exot. Schm.*, *fig.* 120 (1869)	„ „
DISTANT, *Rhop. Mal.*, *p.* 225, 465, *Tab.* 21, *fig.* 2, *Tab.* 44, *fig.* 15 (1882—86)	Catochrysops Cnejus.
L. DE NICÉVILLE, *The Butt. of India*, III, *p.* 178 (1890)	„ „
BINGHAM, *Fauna of Brit. Ind., Butt.* II, *p.* 415 (1907)	„ „
SWINHOE, *Lep. Ind.*, VIII, *p.* 40, *pl.* 649, *fig.* 2—2*d* (1910—11)	Euchrysops „

W. J. Batavia (3—14); Depok (95); Sindanglaya (1074).

C. J. Touban on the north coast; Bodjonegoro (258).

E. J. Tengger mts. (700); mount Ardjouno (HEKMEYER).

The underside is the same in both sexes.

I found the larva often in the pods of *katjang pandjang* (VIANA CATJANG WALK), but as it is of the same ordinary form as that of the larva of LYCAENA BOETICUS L. which is also found in the same pods, and as the colour of different individuals is not always the same, I am not absolutely certain that I may not have confused there two larvae. I believe, however, that the illustrations here given really represent individuals of this species. The form is the usual one of LYCAENA larvae, the colour light green, with a darker dorsal line. Other larvae are olive-green, and some even red. The pupa is also of the usual Lycaenid form, light or olive-green, or light greenish brown, with black dots and patches, which sometimes form a dorsal and two subdorsal

lines. Pupae of April 17th, Sept. 4th, Nov. 24th and Dec. 1st, produced butterflies on April 26th, Sept. 13th, Nov. 30th and Dec. 8th.

De Nicéville gives a description of the larva and pupa, which, although somewhat more minute than mine, agrees with it on the whole, but the habits of the larva which he describes seem to differ considerably from what I observed. He did not find them inside pods, but upon Phaseolus trilobus L. and according to other observers whom he mentions, upon Dolictos Catjang Roxb. And, according to Mrs. Wylly in symbiosis with a large black species of ant. (Canponotus Rubripes, Drury = Sylvaticus F., subspecies Compressus F.). Although I have collected and bred many of these larvae, I have never noticed that they have any connection with ants.

35. Pandava Horsf. (Pl. XXII*a*, *b*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 84, *No.* 19 (1828)	Lycaena	Pandava.
Distant, *Rhop. Mal.*, *p.* 225, *Tab.* 21, *fig.* 17 (1882—86)	Catochrysops	„
Semper, *Schmett. d. Phil.*, I, *S.* 187, *Tab.* 33, *fig.* 13 (1886—92)	„	Vapanda.
de Nicéville, *Butt. of India*, *p.* 283, *pl.* 27, *fig.* 187 (1890)	„	Pandava.
Bingham, *Fauna of Brit. Ind.*, *Butt.* II, *p.* 413 (1907)	„	„
Swinhoe, *Lep. Ind.*, VIII, *p.* 37, *pl.* 649, *fig.* 1—1*d* (1910—11)	Edales	„
Courvoisier, *Tijdschr. v. Ent.*, LV, *bld.* 16	Catochrysops	„

Almost all my specimens are from Batavia. I see little difference in size between individuals.

W. J. Batavia (3—14); Preanger mts. (1000); vicinity of the Wijnkoopsbay or Palabouan Ratou (± 150) on the south coast.

C. J. Srondol (200) (Jacobson).

C. J.?

Snellen is of opinion that the Catochrysops Nicila Swinhoe belongs to this species. Specimens such as de Nicéville gives on plate XXVII fig. 188, as the dry season form, do not seem to occur in Java.

I found the larvae in quantities upon Cycas Circinalis L. They are of the usual Lycaenid form, green or brown, with darker dorsal line, and feed upon the pith of the young shoots, making holes in them into which they creep entirely or partially. The small pupae are light brown, dirty or dark green, mottled with black, and with a black dorsal line. Larvae from July 7th and Nov. 7th produced butterflies on July 13th and Nov. 12th. The larvae on

the cycadae were always in company with a great many ants; it is possible that a certain amount of symbiosis existed between them; I did not, however, investigate the matter. My descriptions of larva and pupa correspond well with MOORE's and the very minute one by DE NICÉVILLE, although I have never seen the bi-colouring of the full grown specimen, of which the latter speaks, and which is also represented in SWINHOE's illustration. Both found the larvae in Ceylon and Calcutta upon Cycadeae, and DE NICÉVILLE expressly mentions also "cultivated Cycadae (CYCAS REVOLUTA) in gardens, eating the hardly-opened shoots or fronds, thereby utterly destroying the appearance of the plant for the year." They lived there in symbiosis with three kinds of ants, PRONOLEPSIS LONGICORNIS Latr., MONOMORIUM SPECULARE Mayr. and CREMARSOYASTER Spec. For., who presumably drive the full-grown larvae into their nests, there to undergo their transformations, as the pupae are never found upon these plants.

36. PARRHASIUS F. (Pl. XXII*a*, *b*).

FABRICIUS, *Ent. Syst.*, III, 1, *p.* 289, *No.* 108 (1793) .	Hesperia	Parrhasius.
DONOVAN, *Ins. of India*, *pl.* 45, *fig.* 5 (1800). . . .	Papilio	„
DISTANT, *Rhop. Mal.*, *p.* 221, *fig.* 66 (1882—86) . .	Everes	„
SEMPER, *Schmett. d. Phil.*, I, *S.* 173 (1882—86). . .	„	„
BINGHAM, *Fauna of Brit. Ind.*, *Butt.* II, *p.* 378, *pl.* XIX, *fig.* 141, 142 (1907)	„	Argiades.
SWINHOE, *Lep. Ind.*, VII, *p.* 265, *pl.* 637, *fig.* 1—1*e* (1905—10)	„	Parrhasius.
COURVOISIER, *Tijdschr. v. Ent.*, LV, *bldz.* 16	„	„

W. J. Batavia (3—14); mount Salak (780); Prayangan mts. (1545); Province of Pekalongan; vicinity of the Wijnkoopsbay or Pelabouan Ratou (± 150).

C. J. Srondol (200), (JACOBSON); Bodjonegoro (250).

E. J. Loumadjang (54); Jember (98); Tengger mts. (800); Kedyry (64).

The colour of the upperside of this common and easily distinguished little butterfly varies in the ♀ very greatly. It is usually brown, sometimes very light and uniform, but usually rather darker and lighter in the middle; in some specimens this middle part is light blue surrounded by a broad pale black edge. Moreover in both sexes there is a considerable difference in size between the individuals, as is usually the case with LYCAENAE. There is no difference discernible between specimens from W. J. and E. J. or between those from the dry or the wet season. Everywhere and in all seasons the individuals were amongst themselves. The underside is the same in both sexes.

37. Ubaldus Cram. (Pl. XXII, 68).

Cramer, *IV, bld.* 209, *pl.* 390 *L. M.* (1782)	Papilio Ubaldus.
Moore, *Proc. Zool. Soc. of London*, 1865, *p.* 505, *pl.* 31, *fig.* 9	Lycaena Zena.
Butler, *Ibid.*, 1886, *p.* 366, *pl.* 35, *fig.* 1	Azanus Uranus.
Bingham, *Fauna of Brit. Ind., Butt.* II, *p.* 362 (1907) . .	„ Ubaldus.
Swinhoe, *Lep. Ind.*, VIII, *p.* 33, *pl.* 648, *fig.* 2, 2*a*, 2*b* (1910—11).	„ „

W. J.?

C. J. Touban on the north coast; Bodjonegoro (258).

E. J.?

The marking on the underside of this species is of the same type as that of Boeticus and related species.

38. Putli Koll. (Pl. XXII, 69).

Kollar *in* von Hügel, *Kaschmir*, IV, 2, *S.* 422, *No.* 8 (1844)	Lycaena Putli.
Snellen, *Tijdschr. v. Ent., bld.* 159, *pl.* 7, *fig.* 1 (1875—76)	„ Gnoma.
Moore, *Lep. of Ceylon*, I, *p.* 77, *pl.* 35, *fig.* 4, 4*a* (1811)	Chilades Putli.
Swinhoe, *Lep. Ind.*, VII, *p.* 275, *pl.* 639, *fig.* 2, 2*a*, 2*b* (1905—10).	„ „

W. J. Batavia (1—5).

C. J.?

E. J.?

I found this small butterfly in the very low-lying parts of Batavia, near Tandjoung-Pryok and Sounthar, as well as in the somewhat higher situated Pegangsaan, sometimes flying in great number round the small plants of *patjy-patjy* (Leucas Linifolia Spr. = L. Lavandalaefolia Sm.).

39. Deliana Sn. (Pl. XXII, 70).

Snellen, *Tijdschr. v. Ent.*, XXXV, *p.* 139 (1892) . . .	Lycaena Deliana.

W. J.?

C. J. Four ♂ captured by me in the Province of Rembang, either near Touban on the north coast, or in the vicinity of Bodjonegoro (258).

E. J.?

The ♂ of this easily distinguished species is minutely described by Snellen in the above mentioned paper.

This description runs as follows: The ground colour of the upperside of this species, which occupies a pretty well isolated position amongst the LYCAENAE of Java is brownish grey, shot with a purple-blue. Along the outer margin, to a width of about 2 mm. it is pretty evenly of a darker shade, and this border is on the secondaries in the cells 4 and 1*c* marked with four black spots, increasing in size downward but not sharply defined. The underside is of a ligt grey ground colour, which on the primaries is slightly mixed with white; on the secondaries also on the costal margin, but more distinctly, forming a broad band before the edge spots. The LYCAENA marking is dark brown grey, not distinct, and the spots are as it were split up, so that on the basal area of the primaries four dark stripes are seen in the middle cell, and two more below them in cell 1*b*, while the usual curved row of lunules is indicated by two rows of dark lines running approximately parallel; except that the line in cell 4 bulges a little. On the secondaries the markings are still more irregular and more shotty, so that the middle and basal spots, as well as the row cannot well be distinguished.

The margin spots are however more distinct, on the secondaries in cell 1*c* and 4 they are decorated by two coal black, bright silver spots. Fringe line of the finest black, fringe mixed grey and white. Thorax, abdomen and legs grey-white, the tarsi ringed with fine black. The ♀ is as yet unknown.

40. AKASA Horsf. (Pl. XXII, 71*a*, *b*).

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 67, *pl.* 1, *fig.* 1, 1*a* (1828)	Polyommatus	Akasa.
MOORE, *Lep. of Ceylon*, I, *p.* 75, *pl.* 34, *fig.* 5 (1881)	Cyaniris	„
SWINHOE, *Lep. Ind.*, VII, *p.* 223, *pl.* 626, *fig.* 1, 1*a*, 1*b* (1905—10)	Lycaenopsis	„
BINGHAM, *Fauna of Brit. Ind., Butt.* II, *p.* 686, *fig.* 78 (1907)	Cyaniris	„
FRUHSTORFER, *Stett. Ent. Zeit.*, 1910, *S.* 283	„	„
COURVOISIER, *Tijdschr. v. Ent.*, LV, *bld.* 16 (1912) . .	„	„

•W. J. Megamendoung, Gedeh and further Prayangan mts. (1500); mount Salak (780).

C. J. Province of Tegal, (Lucassen); Magelang (500).

E. J. Mount Semarou (700) Tosari (1777); Banyouwangy, mount Ardjouno.

This species is very common in all the higher mountains of Java; there is no difference between specimens from W. J. and E. J. SNELLEN notes in connection with this species that the ♀ seems to be little known, as HORSFIELD describes only the ♂ and MOORE's illustration gives as the ♀ of the species that of QUADRIPLAGA, while DE NICÉVILLE only repeats these two writers. A careful

examination including the sexual organs showed that as a rule in the ♂ on the upperside the white on the primaries is more extensive and the bases of the wings as well as the costal margin of the primaries are powdered with blue, but that there are also specimens which lack these distinguishing marks, and in this respect completely resemble the ♀. The underside is the same in both sexes.

41. Quadriplaga Sn. (Pl. XXII, 72*a*, *b*).

Snellen, *Tijdschr. v. Ent.*, XXXV, *bldz.* 143 (1892) . Lycaena Quadriplaga.
de Nicéville, *Journ. Bombay Soc. of Nat. Hist.*, VI,
p. 363, *pl. F, fig.* 13 (1891) . . . . . Cyaniris Coalita.
Fruhstorfer, *Stett. Ent. Zeit.*, 1910, *S.* 299 . . . „ Quadriplagata.

W. J. Megamendoung and Gedeh mts. (1350); mount Malabar (1700); mount Salak (780).

C. J.?

E. J. Mount Ardjouno (de Nicéville).

Fruhstorfer describes a form of this butterfly from E. J. as Aphala. Snellen gives the following notes of the species: "It is related to Akasa, and has the same shape of primaries, only in the ♂ somewhat straighter at the back, while the ground colour of the upperside is also white; but everywhere with broad dusty black outside margin and darkly powdered wing bases so that the white only survives as irregular round patches. In the ♂ these patches are not sharply defined powdered with silver blue, especially towards the inner margin; the veins inside the white, with the exception of vein 5 of the secondaries, are delicate and dark. In the ♀, which has more rounded wings, the white on the upperside is more extensive, as the black margin of the secondaries in particular is narrower the white is also more sharply defined; the dark wing bases are slightly powdered, and on the secondaries the dark spots on the underside show through. The underside is white, with a blue tint in it; the primaries have a delicate dark middle stripe, their bended row consists of large round spots, is placed far back and is strongly curved above, the three undermost lie against the marginal marking. On the secondaries there are four black spots at the base, the curved row is strongly undulating and consists of large black spots, except in cells 5 and 6 where they are small. The marginal markings are as clear as those on the primaries. Fringe line fine black; the fringe bluish white, with very faint dark line over the base, and on the upperside that of the primaries with dark spots. Thorax, abdomen and legs white, the last with black spots.

De Nicéville describes as the ♀ of his Coalita the ♂ of this species, and gives a good illustration of it. Moore describes perhaps the ♂ as the ♀ of Akasa.

42. Marginata de Nic. (Pl. XXII, 73*a*, *b*).

de Nicéville, *Journ. Asiat. Soc. of Bengal*, LII, 2, *p.* 70, *pl.* 1, *fig.* 9 (1883) . . . . . Cyaniris Marginata.
Moore, *Proc. Zool. Soc. of London*, 1883, *p.* 523, *pl.* 48, *fig.* 6 „ „
Bingham, *Fauna of Brit. Ind., Butt.* II, *p.* 319 (1904) . „ „

W. J. Gedeh and further Prayangan mts. (1500—1800).
C. J.?
E. J.?
The underside is the same in both sexes.

43. Puspa Horsf. (Pl. XXII, 74*a*, *b*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 67, *No.* 3 (1828) . Polyommatus Puspa.
Felder, *Novara Lep.*, *S.* 278, *No.* 347, *Tab.* 34, *fig.* 11—13 (1867). . . . . Lycaena Cagaya.
Moore, *Proc. Zool. Soc. of Loudon*, 1879, *p.* 139 . . Cyaniris Transpectus.
„ *Lep. of Ceylon*, I, *p.* 75, *pl.* 34, *fig.* 6, 6*a* (1881) „ Lavendularis.
Bingham, *Fauna of Brit. Ind., Butt.* II, *p.* 323, *pl.* 19, *fig.* 127 (1907). . . . . „ Puspa.
Swinhoe, *Lep. Ind.*, VII, *p.* 208, *pl.* 620, *fig.* 2—2*e* (1905—10) . . . . . Lycaenopsis „
Fruhstorfer, *Stett. Ent. Zeit.*, 1910, *S.* 288. . . . Cyaniris Cossaea.

W. J. Batavia (34); Depok (95); Tjampea (160); Soukaboumi (600); Gedeh mts. (1500); vicinity of the Wijnkoopsbay or Pelabouan Ratou on the south coast (± 150).

C. J. Touban on the north coast.

E. J. Mount Semarou (750); Tengger mts. (1500); Banyouwangy.

A very common species in Java. According to Snellen a great many more names could be added to the above list. One specimen from Depok, and even more one caught in Batavia in the very low lying wood of Pademangan, are much smaller than the others; on the other hand there are many specimens from Batavia just as large as those from the mountains.

Further the shade of blue of the ♂ is sometimes brighter and sometimes

more pale, and the white spots on it vary in size; the ♀ has sometimes a fine handsome metallic light blue on the upperside of the primaries near the base. The black dots also on the underside are more pronounced in one individual than in another. But all this applies equally to specimens from W. J., C. J. or E. J. The seasonal differences which SWINHOE accepts, I cannot acknowledge for Java. In fact his illustrations do not at all correspond to my specimens.

44. COSSAEA de Nic. (Pl. XXII, 75*a*, *b*).

DE NICÉVILLE, *Journ. Bombay, Nat. Hist. Soc.*, 1895, *p.* 271,
pl. O, fig. 14, 15 (1891) . . . . . Cyaniris Cossaea.
DISTANT, *Rhop. Mal.*, *p.* 453, *Tab.* 44, *fig.* 10 ♀ (1882—88) „ „

I do not know this butterfly. FRUHSTORFER found both sexes in W. J. The accompanying illustrations are made from his specimens.

45. CYANICORNIS Sn. (Pl. XXII, 76*a*, *b*).

SNELLEN, *Tijdschr. v. Ent.*, XXXV, *p.* 146 (1892) . . Lycaena Cyanicornis.

W. J. Prayangan mts. (1500—1800).
C. J.?
E. J.?

SNELLEN has described this butterfly of which I possess 8 specimens thus.

This species is distinguished from PUSPA by the blue on the upperside of the primaries being of a different shade, without any white middle spot, while the secondaries are paler, and distinctly more darkly veined, the costal margin of the primaries hair fine black and the outer margin black, not narrowing towards the bottom, and distinctly curved towards the base, before which the blue ground colour is somewhat paler.

The clubs of the antennae are black, on the inner side more or less scaled with light blue. Primaries purple blue, a little greyish, with a bright satin shine especially at the base and along the costal margin, before the dull black outer margin which is quite $2\frac{1}{2}$ mm. broad it is somewhat paler, cross vein unmarked. The secondaries are somewhat paler, especially beyond the median area, where the blue even becomes whitish. All veins except the cross vein, distinctly darker, the costal margin, above the median cell and vein 6 almost entirely brownish grey, the outer margin also, but somewhat darker, and before it faint dark dots in the cells. The underside is white, a little greyish with a blue tint. The vein system is very delicate dark, the cross vein also. On the primaries the bended-row consists of a series of very fine dark lines, near

the outer margin and before it there are faint dark spots in the cells. On the secondaries the cross vein is equally fine dark, but the further markings are more distinct. They consist of three black dots surrounded by a somewhat clearer white rim on the base, an undulating bended row of not much smaller but somewhat less black dots without white rims, of which that in cell 6 lies more inwards than the dot in cell 7 and the marginal dots, wich are larger than those of the primaries (in cell 1*b* two). Fringe line fine, blackish grey, fringe of the primaries on the upperside dark grey, white at the inner angle, on the secondaries white, like the whole fringe on the underside. Thorax and legs blue-white, the latter marked with black, the underside of the abdomen yellow-white.

46. Coalita de Nic. (Pl. XXII, 77*a*, *b*, *c*).

de Nicéville, *Journ. Bombay, Soc. of Nat. Hist.*, VI, *p.* 363,
pl. 1, *fig.* 12 (1891) . . . . . Cyaniris Coalita.
Courvoisier, *Tijdschr. v. Ent.*, LV, *bld.* 16 (1912) . . . „ Dilectus.

W. J. Gedeh mts. (1400); Prayangan mts. (1500—1800).
C. J. Mount Oungaran (1000) (Jacobson).
E. J. Mount Ardjouno (1500).

The ♀ of this species is not yet known with certainty. Snellen thinks it may be found in the specimen *b* here illustrated, in which the white upon the upperside, as also occurs in Puspa and other species, is much extended. This specimen I found, however, on closer examination, to be a ♂. And de Nicéville describes as the ♀ of this species a ♂ of Quadriplaga Sn. The illustration here given of the ♀ of this species was sent by Fruhstorfer.

I see no difference in specimens from W. J. and E. J.

47. Catreus de Nic. (Pl. XXII, 78*a*, *b*).

de Nicéville, *Journ. Bombay, Soc. of Nat. Hist.*, IX, *p.* 276,
pl. O, fig. 20, 21 (1895) . . . . . Cyaniris Catreus.
Fruhstorfer, *Stett. Ent. Zeit.*, 1910, *S.* 298 . . . . . „ „

W. J. Megamendoung, Gedeh and further Prayangan mts. (1500—1800); Soukaboumi (600).

C. J.?

E. J. Province of Pasarouan.

Fruhstorfer describes a specimen from Lawang (500) in E. J. which differs from the usual type and calls it *Hermeias*.

I also possess a ♂ of this species which is freely spotted with white upon the upperside, and actually deviates from the type in exactly the same way as the ♂ of COALITA shown in Pl. XXII, fig. *b* and displays like this a transition towards the marking of the ♀.

48. CEYX de Nic. [1]) (Pl. XXII, 79*a*, *b*).

DE NICÉVILLE, *Journ. Bombay, Soc. of Nat. Hist.*, VIII, *p.* 328, *pl. H, fig.* 6, 7 (1892)	Cyaniris	Ceyx.
DRUCE, *Proc. Zool. Soc. of London*, 1895, *pl.* 32, *fig.* 2, 3	„	Dilectissima.
FRUHSTORFER, *Stett. Ent. Zeit.*, 1910, *S.* 294 . . .	„	Ceyx.
COURVOISIER, *Tijdschr. v. Ent.*, LV, *bld.* 17 (1912) .	„	Dilectissima.

W. J. Mount Magamendoung (1350): Prayangan mts. (1500—1800); Mount Salak (780).

C. J.?

E. J. Mount Semarou (700); Tengger mts. (1200) (JACOBSON).

I possess several specimens of this species, which vary in size, but otherwise are the same from W. J. and E. J.

49. LIMBATUS Moore (Pl. XXII*a*, 80*a*, *b*, *c*).

MOORE, *Proc. Zool. Soc. of London*, 1879, I, *p.* 139	Polyommatus	Limbatus.
„ *Lep. of Ceylon*, I, *p.* 76, *pl.* 35, *fig.* 1, 1*a* (1881)	Cyaniris	Singalensis.
MARSHALL & DE NICÉVILLE, *Butt. of India*, III, *p.* 109 (1890)	Polyommatus	Limbatus.
FRUHSTORFER, *Stett. Ent. Zeit.*, 1911, *S.* 289. . .	Cyaniris	„
MOORE, *Proc. Zool. Soc. of London*, 1882, *p.* 244 .	„	Huegeli.
SWINHOE, *Lep. Ind.*, VII, *p.* 212, *pl.* 631, *fig.* 3—3*d* (1905—10)	Lycaenopsis	„
BINGHAM, *Fauna of Brit. Ind., Butt.* II, *p.* 333 (1907)	Cyaniris	„ race Singalensis.
FRUHSTORFER, *Stett. Ent. Zeit.*, 1910, *S.* 290. . .	Cyaniris	Singalensis.

W. J. Mount Gedeh (1400) Prayangan mts. (1500—1800)

C. J.?

E. J. Tengger mts. (700): Mount Ardjouno (1500).

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[1]) In FRUHSTORFER's opinion there should also be a CYANIRIS ARISTINUS. The drawing sent to me do not, in my opinion, justify this. It presents nothing more than a C. CEYX in a slightly unusual stage of colour evolution.

Snellen assumes two species in these specimens, which he distinguishes as L. Argiolus L. and L. Huegeli Moore. In my opinion, however, they should be united. The opinion that the specimens which Snellen named L. Argiolus are identical with the European species of that name has been shown to be erroneous, as the ♂ genitals differ greatly in the two; on the other hand those which he calls L. Huegeli Moore correspond to Javanese ones which he takes for Argiolus L. Fruhstorfer calls the species dilectus Moore paradilecta, and the form Huegeli forma astarga Frst.

Here again we evidently have two forms of the same species in a different stage of the evolutionary fading process, to which the oldest naming L. Limbatus Moore belongs, while beside it Huegeli Moore may remain as an older form in which the shade of blue on the upperside of the ♂ is distinctly darker than in the former, and is also preserved along the costal margin of the secondaries on the upperside of the ♂, where it has become whitish in the first mentioned form. Of both forms I possess many ♂, but only one ♀, of the form Huegeli Moore.

A third form, which however does not occur in Java, is L. Dilectus Moore (*Proc. Zool. Soc., London*, 1879, I, *p.* 139), there described as L. Limbatus Moore, in which the fading process is even further advanced than in these, so that on the upperside of both wings of the ♂ the white appears in large patches. The difference between these two forms is thus the same as that which arises between individuals of L. Coalita de Nic. (Pl. XXII, 77*a* and *b*).

50. Placida de Nic. (Pl. XXII 82).

de Nicéville, *Journ. Asiat. Soc. of Bengal*, LII, 2, *p.* 68, *No.* 3, *pl.* 1, *fig.* 8 (1883)	Cyaniris	Placida.
Moore, *Proc. Zool. Soc. of London*, 1883, *p.* 523, *pl.* 48, *fig.* 5	„	„
Distant, *Rhop. Mal.*, *p.* 453, *Tab.* 44, *fig.* 7 (1882—86)	„	„
Druce, *Proc. Zool. Soc. of London*, 1895, *p.* 573, *pl.* 32, *fig.* 10	„	Selma.
„ „ „ „ „ „ „ „ „ „ „ „ 4	„	Atrophis.
Swinhoe, *Lep. Ind.*, VII, *p.* 220, *pl.* 624, *fig.* 2—2*c* (1905—10)	Lycaenopsis	Placida.
Bingham, *Fauna of Brit. Ind., Butt.* II, *p.* 326 (1907)	Cyaniris	„
Fruhstorfer, *Stett. Ent. Zeit.*, 1910, *S.* 291. . . .	„	Atrophis.

W. J. Without further indication of place of capture.

C. J.?

E. J. Mount Ardjouno (1500); Banyouwangy.

The two specimens which I possess from E. J. are ♂, the shade of blue

is however different in both; in one it is about the same as that of Musina Sn. ♂; the underside resembles that of L. Puspa Horsf. but is noticeably paler. In my two other specimens, of which one is certainly from W. J., the upperside is exactly like that of Musina Sn., but the underside much brighter, and not to be distinguished from that of Puspa Horsf., but the one has also a little grey dusting near the wing roots, like that peculiar to the one already mentioned from E. J. Perhaps these are two ♀. L. Placida de Nic. makes the impression of being a L. Puspa Horsf. in which the evolution of the white upon the upperside, and the black on the underside is even less far advanced.

Fruhstorfer describes a form from Java as Pellax.

51. Musina Sn. (Pl. XXII, 83).

Snellen, *Tijdschr. v. Ent.*, XXXV, *bld.* 145 (1892) . . .	Lycaena	Musina.
de Nicéville, *Journ. Bombay, Soc. of Nat. Hist.*, IX, *p.* 275 *pl. O, fig.* 15 (1895)	Cyaniris	„
Druce, *Proc Zool. Soc. of London*, 1895, *p.* 273, *pl.* 32, *fig.* 5	„	Lugra.
Fruhstorfer, *Stett. Ent. Zeit.*, 1910, *S.* 300	„	Musina.
Courvoisier, *Tijdschr. v. Ent.*, LX, *bld.* 16, *pl.* 3 (1912) .	„	Lugra, forma floresiana.

Snellen's notes run as follows: Of this species the ♀ is unknown to me. The species is the same as de Nicéville describes, as was shown by a comparison with the specimen which he sent me, his illustration is, however, not very successful. It is, with Placida de Nic., the smallest of the Dilectus group, and is distinguished by the extremely impure almost slaty grey-blue colour of the upperside. It is nowhere powdered with white, but towards the apex and the outer margin of the primaries darkened, also a little along that of the secondaries. The fringe line is upon the primaries hardly indicated, on the secondaries fine black, without any black stripes or dots beside it, as in Placida de Nic.; the costal margin as in this species is very little greyish. Fringe white, but with a dark grey fringe-line above the base, which on the primaries is very much spread out and leaves little of the white over. The underside is also more grey than in the related species, and may even be called pearl-grey, while the markings are distinctly edged, whiter than the ground colour. The markings are only a little darker than the ground, but quite distinct, with the exception of spots on the base upon the secondaries, and the uppermost spot or point in their bended row, which are almost black, and the lowest marginal spots of the secondaries, which may be called grey-black. Fringe line fine black, fringe the same as the wing-ground with a faint dark line above the base.

W. J. Mount Megamendoung (1350); Prayangan mts. (1500—1800).

C. J. Mount Oungaran (800—1000) (JACOBSON).

E. J. Tengger mts. (1500).

FRUHSTORFER describes the ♀ of the species; an illustration would be welcome.

52. HARALDUS F. (Pl. XXII, 81).

FABRICIUS, *Mant. Inst.*, II, *p.* 82, *No.* 744 (1787). .	Papilio Haraldus.
FELDER, *Novara Lep.*, II, *p.* 257, *No.* 303, *Tab.* 32, *fig.* 10, 11 (1865)	Lycaenopsis Ananga.
DISTANT, *Rhop. Mal.*, *p.* 211, *Tab.* 21, *fig.* 6 ♂ (1884)	Cyaniris Haraldus.

This butterfly was caught in W. J. by FRUHSTORFER, the accompanying illustration is made from his specimen.

53. LYSIZONE SN. (Pl. XXII, 84*a*, *b*).

SNELLEN, *Tijdschr. v. Ent.*, XIX, *bld.* 159, *pl.* 7, *fig.* 1 (1875—76)	Lycaena	Lysizone.
DISTANT, *Rhop. Mal.*, *p.* 212, *Tab.* 20, *fig.* 9 (1882—86)	Zizera	„
SEMPER, *Schm. d. Phil.*, I, *S.* 171, *Tab.* 32, *fig.* 19, 22 (1886—92)	„	Otis.
SWINHOE, *Lep. Ind.*, VII, *p.* 260, *pl.* 636, *fig.* 1—1*d* (1905—10)	„	„
BINGHAM, *Fauna of Brit. Ind.*, *Butt.* II, *p.* 360 (1907) .	„	„
COURVOISIER, *Tijdschr. v. Ent.*, LV, *bld.* 16 (1912) . .	„	„

W. J. Batavia (3—14): Prayangan mts. (1545).

C. J. Touban on the north coast, Tegal; Pekaloungan; Srondol (200) (JACOBSON).

E. J. Mount Ardjouno (1000); Jember (98); Kedyry (66).

With regard to the question of whether this species is the same as the OTIS of FABRICIUS, AURIVILLIUS says that the type of the latter has been lost, and further acknowledges that from the description of it alone the question cannot be settled. Under these circumstances SNELLEN considers that the name OTIS should also be abandoned.

The butterfly is extremely common in Java. As the original illustration was not all that could be desired, better ones are given here. These illustrations are very successful; they do not agree with SWINHOE. In this species too, there are great varieties in size, in which however I can see nothing but individual differences. The underside is the same in both sexes.

The larva on *sisih betoek* (VANDELLIA CRUSTACEA BENTH, or DESMODIUM TRIFLORUM D. C.). DE NICÉVILLE bred it in Calcutta with ALYSICARPUS VAGINALIS. It is light green, with a dark dorsal line. The pupa light brown or green with some black marbling, interrupted here and there, at the front a broadened dorsal line and two subdorsal rows of spots. Larva and pupa of the usual Lycaenid form. From a pupa of Aug. 17th a butterfly emerged on Aug. 25th.

54. PYGMAEA Sn. (Pl. XXII, 85*a*, *b*).

SNELLEN, *Tijdschr. v. Ent.*, XIX, *bldz.* 163, *pl.* 7, *fig.* 3 (1875—76)	Lycaena	Pygmaea.
MOORE, *Lep. of Ceylon*, I, *p.* 79, *pl.* 35, *fig.* 5, 5*a* (1881)	Zizera	„
DISTANT, *Rhop. Mal.*, *p.* 454, *fig.* 126 (1882—86) . .	„	„
BINGHAM, *Fauna of Brit. Ind.*, *Butt.* II, *p.* 359 (1907) .	„	Gaika.
SWINHOE, *Lep. Ind.*, VII, *p.* 256, *pl.* 635, *fig.* 2—2*a* (1905—10)	„	„

W. J. Batavia (3—14); Prayangan mts.

C. J. Touban on the north coast; Dander (± 30); Pekaloungan (VAN DEVENTER).

E. J. Kedyry (64); Mount Willis.

This little butterfly is very common in Java, and according to SNELLEN different from GAIKA Trim.

As the original illustration was not all that could be desired, improved ones are here given.

There is a great difference in the size of individuals, but neither in this nor in any other way, can I discover a seasonal variation. But, as I think I remember, the ♀ when caught are very dark, almost black; in the collection they are however all a rather light brown; I believe this is due to fading in mounting, and I have restored the dark colour in the illustration.

Genus LYCAENESTHES Moore.

1. BENGALENSIS Moore (Pl. XXII, 86*a*, *b*).

MOORE, *Proc. Zool. Soc., London*, 1865, *p.* 773, *pl.* 41, *fig.* 9.	Lycaenesthes	Bengalensis.
DISTANT, *Rhop. Mal.*, *p.* 458, *Tab.* 44, *fig.* 9 (1882—86)	„	„
DE NICÉVILLE, *Butt. of India*, III, *p.* 128 (1890) .	„	Emolus.

Bingham, *Fauna of Brit. Ind., Butt.* II, *p.* 372 (1907) Lycaenesthes Emolus.
Swinhoe, *Lep. Ind.*, VIII, *p.* 55, *pl.* 652, *fig.* 1, 1*a*,
1*b* (1910—11) . . . . . „ „
Courvoisier, *Tijdschr. v. Ent.*, LV, *bld.* 17 (1912) . „ „

According to Snellen the description which Godart gives of his Polyommatus Emolus, is so vague and applicable to different species, that de Nicéville has been confused by it, and applied it to Lycamba Hew. He thinks therefore that the name Bengalensis as Moore calls it, with a clear description, deserves the preference.

W. J. Batavia (8—14); vicinity of the Wijnkoopsbay or Pelabouan Ratou and the Sandbay or Tjiletou on the south coast (± 150).

C. J. Touban on the north coast.

E. J. Without further indication of place of capture.

According to de Nicéville the larva, which varies very much, feeds upon Nephelium Litchi Lamb., Cassia Fistula L. and Heynea Trijuga Roxb.; it is said to live in symbiosis with the ant Occaphylba Smaragdina F. and the pupa to be of the usual Lycaenid shape.

2. Lycaenina Feld. (Pl. XXII, 87).

Felder, *Vest. Zool. Bot. Ver.*, 1868, *S.* 281. . . Lycaenesthes Lycaenina.
Hewitson, *III, Diurn. Lep.*, *p.* 219, *pl.* 90, *fig.* 6, 9
(1878) . . . . . „ „
Distant, *Rhop. Mal.*, *p.* 232, *Tab.* 21, *fig.* 3 (1882—86) „ „
de Nicéville, *Butt. of India*, III, *p.* 132, *pl.* 26,
fig. 178 (1890) . . . . . „ „
Bingham, *Fauna of Brit. Ind., Butt.* II, *p.* 375 (1907) „ „
Swinhoe, *Lep. Ind.*, VIII, *p.* 57, *pl.* 652, *fig.* 2,
2*a*, 2*b* (1910—11) . . . . . „ „

W. J.?

C. J.?

E. J. A ♂ without further indication of place of capture. The illustration is made from this specimen, presented to me by Dr. Pagenstecher. The ♀ is unknown to me.

3. Tessellata Moore (Pl. XXII, 88).

Moore, *Proc. Zool. Soc., London*, 1874, *p.* 572, *pl.* 66
fig. 6 . . . . . Niphanda Tessellata.

Distant, *Ann. and Mag. of Nat. Hist.*, V, *Ser.* 17, *p.* 253 (1886)	Lycaenesthes	Aethiops.
„ *Rhop. Mal.*, *p.* 458, *Tab.* 42, *fig.* 13 (1882—86)	„	„
„ „ „ „ „ „ 44 „ 21 „ „	„	„

W. J. Prayangan (1500) (Sijthoff).
C. J.?
E. J.?
I possess only one ♀.

4. Cymbia de Nic. (Pl. XXII, 89).

de Nicéville, *Journ. As. Soc. Bengal*, 1883, *p.* 76, *pl.* 9, *fig*, 8, 9 (1883)	Nyphanda	Cymbia.
Moore, *Proc. Zool. Soc.*, 1883, *p.* 524, *pl.* 48 *fig.* 8 ♀	„	Plinioides.
Staudinger, *Exot. Schmett.*, *S.* 270, *Taf.* 94 (1888) .	„	Cymbia.
de Nicéville, *Butt. of India*, III, *p.* 132, *Front.*, *p.* 130 ♂, 131 ♀ (1890).	„	„
Bingham, *Fauna Brit. India*, *Butt.* II, *p.* 370, (1901).	„	„
Swinhoe, *Lep. Ind.*, VIII, *p.* 52, *pl.* 651, *fig.* 3, 3*a*, 3*b*	„	„

The illustration of the ♂ is made from a specimen caught by Fruhstorfer near Sukaboumi in W. J. This species is unknown to me.

Genus AMBLYPODIA Horsf.

1. Narada Horsf. (Pl. XXIII, 90*a*, *b*, *c*, *d*, *e*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 98, *No.* 30 (1828) .	Amblypodia	Narada.
„ „ „ „ „ „ *pl.* 1, *fig.* 8, *pl.* 4, *fig.* 4, 4*a*	Thecla	„
„ & Moore, *Cat. Lep. E. I. C.*, I, *p.* 39, *No.* 51, *pl.* 1, *fig.* 4, 4*a* (1857)	Amblypodia	„
Distant, *Rhop. Mal.*, *p.* 276, *pl.* 21, *fig.* 23 (1882—86)	„	„
de Nicéville, *Butt. of India*, III, *p.* 210 (1890) . .	„	„
Bethune—Baker, *Trans. Ind. Soc., London*, XVII, 1, *p.* 16, *pl.* 4, *fig.* 3, 3*a* (1903).	„	„
Swinhoe, *Lep. Ind.*, VIII, *p.* 136, *pl.* 670, *fig.* 2—2*c* (1910—11)	„	„

In Snellen's opinion the A. Anita Hew. of which illustrations are given by de Nicéville (pl. XXVII ♀) and by Swinhoe (pl. 671, fig. 1—16) and which Bethune Baker also mentions, belongs also to this species.

A comparison of the 4 ♂ and the 5 ♀ in my possession leads me to the same conclusion. There are males in which the upperside is entirely of brilliant purple blue, others in which it is a darker blue, and yet others in which the blue on the upperside is almost entirely replaced by brown. There are ♀ in which the colour of the upperside of the primaries is bright dark blue or light greenish blue or clear light blue. But the blue in all ♂ is invariably surrounded by a narrow, sometimes very narrow, darker band, and in all ♀ by a very broad one. The underside is different in every specimen, but in the ♂ always much more darkly mottled than in the ♀, the colour of which is there sometimes very light, while all ♀ there display a dark line which runs slanting across both wings and which is absent in all ♂. Neither are these differences of colour to be connected with E. J. or W. J. The underside, the differences of colour of which strongly remind us of those in Cyllo Leda L., indicates that this is a species in which an evolutionary colour change is proceeding, which may be recognized by the differences of colour and markings in the individuals.

W. J. Batavia (3—14); Depok (95); Tjampea (169); vicinity of the Wijnkoopsbay or Pelabouan Ratou on the south coast (± 150).

C. J. Bodjenegoro (258).

E. J. Province of Pasourouan; Tengger mts. (coll. Courvoisier).

The egg is described by Doherty as "large, coarse, overlaid with white, roughly tubercular and indented with spaces obscurely hexagonal". Larva and pupa have been illustrated by Swinhoe and described by de Nicéville after Horsfield's illustrations. The larva is "of the usual Lycaenid shape, onisciform, with head small, second segment much larger, the segments gradually increasing in width to about the seventh, then decreasing to the anal segment, which is bluntly pointed, the constrictions between the segments fairly well marked; a few short bristly hairs on the sides of the body". The plant on which it feeds is not mentioned. The pupa is "usually lengthened and attenuated, with head rounded, thorax humped in the middle, abdominal segments very slender, the tail sharply pointed".

I include here the drawing of a larva from Java, the food plant of which is also unkwown to me. It was onisciform, the first part of the body, especially in repose, longer and broader than the hinder part. The head is bent down and concealed under the foremost segment, as is the case with many Lycaenid larvae. The larva is a handsome greenish yellow, with a dorsal, suprastigmatic and infrastigmatic stripe, all light blue, which stripes do not continue to the

thoracic segments, or only very faintly. The dorsal stripe is formed by a concatination of small lines on the back of each segments, the front part of which is narrow but broadening towards the back. The illustration is well executed, but as it is drawn from the side it does not show the peculiar shape of the body. The pupa, of a very humped shape hung close against the side of the box, by the tail, but even after careful examination I could not discover a girdle-thread. It was mottled with brown, light greyish on the back, the rest of it darker or more reddish, with a black dorsal-line.

Genus IRACTA Moore.

1. Timoleon Stoll (Pl. XXIII, 91*a*, *b*).

Stoll, *Suppl. op Cramer, bldz.* 146, *pl.* 32, *fig.* 4 (1790)	Papilio	Timoleon.
Horsfield, *Cat. Lep. E. I. C., p.* 108, *No.* 140 (1828)	Amblypodia	Rochana.
Boisduval, *Spec. Gen.*, I, *pl.* 22, *fig.* 4 (1836). . .	Thecla	Timoleon.
Horsfield & Moore, *Cat. Lep. E. I. C.*, I, *p.* 44, *No.* 67, *pl.* 12, *fig.* 3, 3*a* (1857) . . .	Amblypodia	„
„ „ „ *Cat. Lep. E. I. C.*, I, *p.* 44, *No.* 68, *pl.* 1, 1*a*, *fig.* 10, (1857) . . .	„	Rochana.
Distant, *Rhop. Mal., p.* 258, *Tab.* 22, *fig.* 3 (1882—86)	Iracta	Boswelliana.
Staudinger, *Exot. Schm., S.* 279, *Taf.* 96 (♂) (1884—88)	„	Timoleon.
„ „ „ „ „ „ „ (♀) „ „	„	Boswelliana.
de Nicéville, *Butt. of India*, III, *p.* 215, *pl.* 27, *fig.* 192, 193 (1890)	„	Timoleon.
Swinhoe, *Lep. Ind.*, VIII, *p.* 132, *pl.* 669, *fig.* 3—3*c*, *pl.* 705, *fig.* 1, 1*a* (1910—11)	„	„
Bethune—Baker, *Trans. Zool. Soc. of London*, XVII, 1, *p.* 9, *pl.* 4, *fig.* 2, 2*a* (1903).	„	„

The underside of both sexes is the same.

According to Snellen, J. Maecenas F. and J. Rochana Horsf. also belong to this species. Swinhoe takes the former as the dry-season broad.

W. J. Mountains in the Province of Prayangan. Vicinity of the Wijnkoopsbay or Pelabouan Ratou on the south coast (± 150).

C. J. Province of Tegal (Lucassen).

E. J.?

Swinhoe gives two illustrations and two descriptions of larva and pupa. It is supposed to live upon Ficus species, and to eat both the leaves and the bark.

One description runs as follows: "Larva, onisciform, 0.9 of an inch in length, head very small; second segment rather large, third and fourth progressively larger then gradually decreasing in width to the anal segment; constructions between the segments very shallow, head pinkish; dorsal area pale pink, shading off laterally into pale greenish; the anal segment entirely pale greenish; three series of similar dots on each side, no prominent markings whatever, but gradually becomes dark green before pupating. Pupa, very short and thick, dark brown streaked with darker brown; head case well marked; the abdomen very slightly constricted behind the thorax, posteriorly much rounded."

The other description is: "Larva very stout, but is much constricted in the middle so that the circumference is greatest about the 3rd or 4th and 9th or 10th segments, varying a little with position. It moves as freely backwards as forwards, the whole ventral surface adhering closely to the branch, as that head and legs are seldom visible. The colour is clear green, with or without a brown bar on each side of the 10th segment. Pupa, thick and short, humped on the thorax and somewhat constricted behind; light brown mottled with darker." When the larva were found there were no ants with them, "but after they became pupae they were discovered by a nest of common house ants, and were immediately put under a guard and carefully watched." The drawings of the latter larva by SWINHOE very closely resemble that which I give of former species.

2. INORES Hew. (Pl. XXIII, 92).

HEWITSON, *Ent. Monthly Mag.*, IX, *p.* 85 (1872) . . . . Jolaus Inores.
„ *III, Diurn. Lep.*, VIII, *p.* 27, *pl.* 4*a*, *fig.* 44, 45 (1878) „ „
DE NICÉVILLE, *Journ. As. Soc. of Bengal*, LXIII, *p.* 39, *pl.* 4, *fig.* 4 (1896). . . . . Tajuria Blanka.

The ♀ shown in the illustration was caught by me near Batavia (14); in life the eyes were light green. SNELLEN, judging by the nerve system of the specimen, the only one known to him in natura, considers that this species should be brought under the genus IRAOTA Hew., although it looks like a JOLAUS species, and HEWITSON regards it as such, and illustrates it accordingly. The ♂ is unknown to me.

Genus SURENDRA Moore.

1. Vivarna Horsf. (Pl. XXIII, 93*a*, *b*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 99, *No.* 31 (1828) .	Amblypodia	Vivarna.
Hewitson, *Cat. Lyc. Brit. Mus.*, *p.* 13, *No.* 61, *pl.* 7, *fig.* 73, 75, 77 (1862)	„	„
de Nicéville, *Butt. of India*, III, *p.* 221 (1890). . .	Surendra	„
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1 (1903)	„	„

W. J. Vicinity of the Wijnkoopsbay or Pelabouan Ratou and the Sandbay or Tjiletou, on the south coast (± 150).

C. J.?

E. J. Tengger mts. (700); mnt. Semarou (750).

2. Florimel Doh. (Pl. XXIII, 94*a*, *b*).

Doherty, *Journ. As. Soc. Bengal*, 1889, *p.* 424, *pl.* 23, *fig.* 17, 4	Surendra	Florimel.
de Nicéville, *Butt. of India*, III, *p.* 223.	„	„
„ *Journ. Bombay Nat. Hist. Soc.*, IX, 1895, *p.* 279, *pl. O*, *fig.* 23	„	Stimula.
Bethune—Baker, *Trans. Zool. Soc., London*, 1905, *p.* 7	„	Florimel.
Swinhoe, *Lep. Ind.*, VIII, *p.* 130, *pl.* 669, *fig.* 2—2*c* (1910)	„	„

De Nicéville gives this species as belonging to Java; Fruhstorfer also possesses them from there, and I have a large ♀ from Pasarouan (E. J.). I regard the distinction between this and the foregoing species as still very doubtful, as the presence or absence of a tail cannot be regarded as a specific characteristic; I do not, however, possess sufficient material to be able to decide the matter. The illustration of the ♂ is made from a specimen belonging to Fruhstorfer.

Genus MAHATHALA Moore.

1. Ameria Hew. (Pl. XXIII, 95*a*, *b*).

Hewitson, *Cat. Lyc. B. M.*, *p.* 14, *No.* 64, *pl.* 8, *fig.* 85, 86 ♀ (1862)	Amblypodia	Ameria.
Distant, *Rhop. Mal.*, *p.* 268, *Tab.* 21, *fig.* 30 ♀ (1882—86)	Narathura	„

DE NICÉVILLE, *Butt. of India*, III, *p.* 283, *pl.* 27, *fig.* 200 ♀	Mahathala	Ameria.
BETHUNE—BAKER, *Trans. Zool. Soc., London*, XVII, 1, *p.* 22 (1903)	„	„

This species was procured by FRUHSTORFER in E. J. The accompanying illustrations are made from his specimens.

Genus ARHOPALA Bsd.

1. CENTAURUS F. (Pl. XXIII, 96*a*, *b*, *c*, *d*).

FABRICIUS, *Syst. Ent.*, *p.* 520, *No.* 329 (1778)	Papilio	Centaurus.
HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 102, *No.* 33 (1828)	Amblypodia	Pseudocentaurus.
HEWITSON, *Cat. Lep. Brit. Mus.*, *p.* 3, *No.* 15, *pl.* 2, *fig.* 10, 13 (1862)	„	Centaurus.
FELDER, *Novara*, *Lep.*, *S.* 222, *Taf.* 29, *fig.* 14 (1867)	Arhopala	Nakula.
DISTANT, *Rhop. Mal.*, *p.* 261, *Tab.* 21, *fig.* 4, 5 (1882—86)	Narathura	Centaurus.
PAGENSTECHER, *Jahrb. d. Nass.*, V, 43, *S.* 107 (1890)	Arhopala	Amazona.
DE NICÉVILLE, *Butt. of India*, III, *p.* 234 (1890)	„	Centaurus.
BETHUNE—BAKER, *Trans. Zool. Soc., London*, XVII, 1, *p.* 39, *pl.* 4, *fig.* 10, 10*a* (1903)	„	„
SWINHOE, *Lep. Ind.*, VIII, *p.* 147, *pl.* 672, *fig.* 3, ,*a*3 3*b* (1910—11)	„	„

W. J. Batavia (3—14); Depok (95); Soukapoura (70).

C. J. Mt. Ounarang (1000) (JACOBSON); Tjandi (60) (JACOBSON).

E. J. Without further indication of place of capture.

Together with APIDANUS in W. J. the most common species of this genus. The colour of the upperside, both in W. J. and E. J. is subject to variations in shade.

A special form PSEUDOCENTAURUS cannot, therefore, be assumed upon this basis.

The larva feeds upon the leaf of *boungour* (LAGERSTROEMIA spec.) and probably also of *manga* (MANGIFERA), as a pupa was found upon a *manga* leaf. As it displays a mixture of green, brown and black, which moreover undergoes some change during different periods of its life, a description of it would necessarily be very confused, and I shall therefore content myself with

only publishing a very satisfactory illustration of it, to which I will add that everywhere along the edge of the abdomen stiff black hairs protrude. In the fairly good illustration the pupa lies on a leaf bound together with firm bundles of threads, attached at the tail end by a girdle-thread; it is very dark brown. Pupae of Nov. 22nd, Feb. 12th and Feb. 15th produced imagines on Dec. 3rd, Feb. 23rd and Feb. 26th.

2. Amantes Hew. (Pl. XXIII, 97).

Hewitson, *Cat. Lyc. B. M.*, *p.* 4, *pl.* 2, *fig.* 2, 3 (1862)	Amblypodia	Amantes.
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1, *p.* 42 (1903)	Arhopala	„
Swinhoe, *Lep. Ind.*, VIII, *p.* 150, *pl.* 673, *fig.* 3—3*c* (1910—11)	„	„

This species is unknown to me. Fruhstorfer possesses it from Java. The illustration is made from his specimens. Larva and pupa are given by Moore in an illustration in *Lep. of Ceylon*, and reproduced by Swinhoe.

3. Vihara Felder (Pl. XXIII, 98*a*, *b*).

Felder, *Wien. Ent. Mon.*, IV, *S.* 395, *No.* 5 (1860)	Amblypodia	Vihara.
„ *Novara Lep.*, II, *p.* 228, *No.* 253, *Taf.* 29, *fig.* 7 (1867)	„	„
Distant, *Rhop. Mal.*, *p.* 270, *No.* 16, *fig.* 80 (1882—86)	Narathura	„
de Nicéville, *Butt. of India*, III, *p.* 241 (1890) . .	Arhopala	„
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1, *p.* 71, *pl.* 2, *fig.* 2 (1903)	„	Malayica.
Fruhstorfer, *Deutsche Ent. Zeitschr. Iris*, XXVIII, *S.* 134 (1914)	„	„

Swinhoe says that Felder's types do not differ from A. Centaurus, but that his illustration is inaccurate, and that the butterflies described by Distant and Bethune-Baker belong to another species. Snellen maintains that although Vihara resembles a small Centaurus, the secondaries of the former species are lobed at the inner angle, and the apex of the primaries is blunter, and that this constitutes a definite difference, while moreover the patches on the underside of the primaries in the discal cell, which are not darker than the ground colour, have not a greenish silver rim. These differences actually occur with such constancy in the many Javan species that I have before me, that I am also constrained to regard them as specific. I, therefore, consider that the

name Vihara should be retained. It is however not Bethune—Bakers Vihara, but his Malayica.

Fruhstorfer calls the Java form Fundania.

W. J. Buitenzorg (265), the mountains there about, and Prayangan mts. C. J.?

E. J. Tengger mts. (Fruhstorfer).

4. Adorea de Nic. (Pl. XXIII, 99).

de Nicéville, *Butt. of India*, III, *p.* 238, *pl. front.*, *fig.* 139 (1890) . . . . . Arhopala Adorea.
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1, *p.* 67 (1903) . . . . . „ „
Swinhoe, *Lep. Ind.*, VIII, *p.* 187, *pl.* 684, *fig.* 1, 1*a*, 1*b* (1910—11) . . . . . „ „

I am in possession of both sexes from W. J. Fruhstorfer calls the Java form Georgias.

5. Sandakani Beth.—Baker and Druce (Pl. XXIII, 99*bis*).

Bethune—Baker & Druce, *Proc. Zool. Soc., London*, 1896, *p.* 671, *pl.* 31, *fig.* 2 ♂ . . Arhopala Sandakani.
„ „ *Trans. Zool. Soc., London*, XVII, 1, *p.* 68 (1903) . . . . . „ „
Fruhstorfer, *Deutsche Ent. Zeitschr. Iris*, XXVIII, *S.* 137 (1914) . . . . . „ „

I do not possess this species. Fruhstorfer found a specimen of the Java form, which he calls Aytonia, in the mountains of W. J. The illustration is made from this specimen.

6. Apha de Nic. (Pl. XXIII, 100*a*, *b*).

de Nicéville, *Journ. Bomb. Nat. Hist. Soc.*, IX, *p.* 287, *pl. O*, *fig.* 31 ♂ (1895) . . . . . Arhopala Apha.
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1, *p.* 69 (1903) . . . . . „ „
Swinhoe, *Lep. Ind.*, VIII, *p.* 154, *pl.* 674, *fig.* 3, 3*a* (1910—11) „ „

W. J. Buitenzorg (265), Prayangan mts.

C. J.?

E. J.?

Fruhstorfer also possesses this species from Java.

7. Anthelus Doubl. and Hew. (Pl. XXIII, 101).

Doubleday *and* Hewitson, *Gen. Diurn. Lep.*, II, *p.* 478, *pl.* 74, *fig.* 6 ♂ (1852)	Amblypodia	Anthelus.
Distant, *Rhop. Mal.*, *p.* 263, *Tab.* 23, *fig.* 4 ♀ (1885)	Narathura	„
de Nicéville, *Butt. of India*, III, *p.* 259 (1890) . .	Arhopala	„
Bethune—Baker, *Trans. Zool. Soc. London*, XVII, 1, *p.* 78 (1903)	„	„
Swinhoe, *Lep. Ind.*, VIII, *p.* 155, *pl.* 675, *fig.* 1—16 (1910—11)	„	„

W. J. Many ♂ from the vicinity of the Tjiletou or Sandbay on the south coast, (± 150); one ♀ from the environs of Soukaboumi (607). The ♀ differs from the ♂ only in the black margin to the upperside of the primaries, which is also the case in the following species.

C. J.?

E. J.?

8. Auzea de Nic. (Pl. XXIII, 102*a*, *b*).

de Nicéville. *Journ. Bombay Soc. Nat. Hist.*, X, *p.* 1, *pl. S*, *fig.* 29, 30 (1895)	Arhopala	Auzea.
Röber, *Entom. Nachr.*, XXIII, *p.* 6 (1897) . . .	Amblypodia	Fruhstorferi.
Bethune—Baker, *Trans. Zool. Soc.*, *London*, XVII, 1, *p.* 80 (1903)	Arhopala	Auzea.

W. J. Vicinity of the Sandbay or Tjiletou and of the Wijnkoopsbay or Pelabouan Ratou on the south coast (± 150).

C. J.?

E. J.?

The illustration given by de Nicéville, with which I am not acquainted, is rejected by Snellen. My illustrations are satisfactory.

9. Eumolphus Cram. (Pl. XXIV, 103*a*, *b*, *c*).

Cramer, *IV*, *bld.* 19, *pl.* 299 *G. H.* (1782) . . .	Papilio	Eumolphus.
Hewitson, *Cat. Lyc. Brit. Mus.*, *p.* 8, *No.* 36, *pl.* 8, *fig.* 89 (1862)	Amblypodia	„
„ *Cat. Lyc. Brit. Mus.*, *p.* 8, *No.* 37, *pl.* 8, *fig.* 87, 88 (1862)	„	Aurea.

Distant, *Rhop. Mal.*, *p.* 263, *Tab.* 23, *fig.* 10 ♀ (1882—86)	Arhopala	Maxwelli.
„ „ „ „ 264, „ „ „ 3 ♂ „	Narathura	Turguhari.
„ „ „ „ 275, *fig.* 87, *p.* 464 „	Arhopala	Trogon.
de Nicéville, *Butt. of India*, III, *p.* 268 (1890). . .	„	Eumolphus.
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1, *p.* 164, *pl.* 2, *fig.* 20, *pl.* 5, *fig.* 14, 14*a* (1903)	„	„
„ „ *Trans. Zool. Soc., London*, XVII, 1, *p.* 102, *pl.* 2, *fig.* 17 ♂	„	Adonias.
Swinhoe, *Lep. Ind.*, VIII, *p.* 158, *pl.* 676, *fig.* 1, 1*a*, 1*b* (1910—11)	„	„
Fruhstorfer, *Neue Arhopala Rassen*, *Iris*, 1814, *p.* 121	„	„

W. J. Depok (95) Gedeh mts.; mnt. Malabar (1700); vicinity of Pelabouan Ratou or the Wijnkoopsbay (± 150).

C. J.?

E. J. Province of Pasourouan.

In life the head is silver-white, and the eyes are a handsome metallic dark green. The green metallic shimmer of the ♂ is sometimes brass coloured. Swinhoe as well as Snellen consider Hellenois Doh. and Viridissima Swinhoe to be forms of this species. Fruhstorfer inclines to distinguishing three subspecies in Java, Adonias from E. J., Grynea from W. J. and Sanherib from the mountains of W. J. (1200). I do not possess such extensive material as my colleague, but still I have, besides several specimens from W. J., one ♂ from the mountains there (1700) and two ♂ from E. J. I cannot observe any differences between these, except that the metallic green patches along the inner margin on the underside of the secondaries in both my specimens from E. J. have practically disappeared, while in the W. Java specimens they are always very clearly visible, although varying in intensity in the individual. The accompanying illustration of the form Sanherib is made from a specimen belonging to Fruhstorfer.

10. Horsfieldi Pag. (Pl. XXIV, 104*a*, *b*).

Pagenstecher, *Jahrb. d. Nass. V. d. Nat.*, 43, *S.* 106 (1890)	Amblypodia	Horsfieldi.
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1, *p.* 107, *pl.* 2, *fig.* 76 (1903).	„	„
Fruhstorfer, *Neue Arhopala Rassen. Iris*, 1814, *p.* 126	„	„

W. J. Vicinity of the Tjiletou or Sandbay on the south coast (± 150); Soukaboumi (607) (coll. COURVOISIER).

C. J.?

E. J. Malang (443); Tengger mts. (FRUHSTORFER); without further indication of place of capture (coll. COURVOISIER).

FRUHSTORFER assumes as subspecies *Vellanus* from W. J. and HORSFIELDI from E. J. The marking and colour of the underside of the secondaries of the specimens in E. J. differ clearly from those in W. J. I cannot, however, observe any other differences.

In the Leiden museum there is a ♂, said to have been caught in Java, that deviates considerably from the normal in the shade of colour and in the extent of the metallic patch on the upperside of the primaries.

11. AZATA de Nic. (Pl. XXIV, 105*a*, *b*).

DE NICÉVILLE, *Journ. A. S. B.*, LXIV, 2, *p.* 466 (1895) .	Arhopala	Azata.
BETHUNE—BAKER, *Trans. Zool. Soc., London*, XVII, 1, *p.* 48 (1903)	„	„

W. J. Without further indication of place of capture.

C. J.?

E. J.?

FRUHSTORFER calls the Java form of this butterfly PANGERAN.

12. BAZALOIDES Hew. (Pl. XXIV, 106*a*, *b*).

HEWITSON, *III, Diurn. Lep.*, VIII, *p.* 21, *pl.* 7, *fig.* 62 (*not.* 63) (1878)	Amblypodia	Bazaloides.
„ *III, Diurn. Lep.*, VIII, *p.* 21, *pl.* 7, *fig.* 65 (*not.* 64) (1878)	„	Bupola.
DE NICÉVILLE, *Butt. of India*, III, *p.* 243 (1890) . .	Arhopala	Bazalus.
„ „ „ „ „ „ 250, *pl.* 27, *fig.* 197 (1890)	„	Feesta.
BETHUNE—BAKER, *Trans. Zool. Soc., London*, XVII, 1, *p.* 119 (1903)	„	Bazalus.
SWINHOE, *Lep. Ind.*, VIII, *p.* 166, *pl.* 678, *fig.* 1, 1*a*, 1*b* (1910)	„	„
COURVOISIER, *Jav. Lyc. Tijdschr. v. Ent.*, LV, *p.* 18 (1912)	„	„
FRUHSTORFER, *Neue Arhopala Rassen, Iris*, XXVIII, 2, *p.* 131 (1914)	„	„

It is very difficult to decide upon the correct systematic name for this species. I have kept to SNELLEN's, because I find in his notes that he adopts it not so much upon the ground of HEWITSON's hasty description and illustration, as because our Java specimens correspond to the specimens in HEWITSON's collection, which he himself determined as the species A. BAZALOIDES. SNELLEN takes HEWITSON's A. BUPOLA to be the ♀ of this species. I think, however, that our Javan specimens much more resemble HEWITSON's illustration of his A. BAZALUS (Cat. Lep. B. M., p. 8, pl. 4, fig. 37, 38) than his A. BAZALOIDES, and it is the same in regard to the illustrations which SWINHOE gives of these two species, neither does BETHUNE—BAKER's illustration of A. BAZALOIDES correspond to my Javan specimens. There is moreover some confusion, for, whereas SNELLEN brings both the A. BAZALUS and A. FEESTA of DE NICÉVILLE under BAZALOIDES, BETHUNE—BAKER is of opinion that only the former is identical with BAZALOIDES, while A. FEESTA is the same as BAZALUS. Much more extensive material than I have at my disposal would be needed to clear up this point of difference.

FRUHSTORFER calls the Javan form PRATINAS. According to him the specimens from E. J. are larger than those from W. J. and have somewhat rounder wings.

W. J. Prayangan mts. (1545). Ibid. (500—1000) (FRUHSTORFER).

C. J. Mnt. Lawou (JACOBSON).

E. J. Province of Pasourouan; mnt. Ardjouno (1600); Tengger mts. (300) (FRUHSTORFER).

13. AZINIS de Nic. (Pl. XXIV, 107).

DE NICÉVILLE, *Journ. Bomb. Soc. of Nat. Hist.*, X, *p.* 3, *pl. T, fig.* 31 (1895)	Arhopala	Azinis.
DRUCE, *Proc. Zool. Soc., London*, 1896, *p.* 662, *pl.* 30, *fig.* 4 ♀	„	Kounga.
BETHUNE—BAKER, *Trans. Zool. Soc., London*, XVII, 1, *p.* 122 (1903)	„	Azinis.

In the Leiden museum there is a ♂ specimen corresponding well with DE NICÉVILLE's illustration and description, which was sent long ago by MULLER, as having been caught in Java, without, however, any further indication of the place of capture.

14. AEDIAS Hew. (Pl. XXIV, 108).

HEWITSON, *Cat. Lyc., B. M., p.* 6, *pl.* 4, *fig.* 36 ♂ (1862)	Amblypodia	Aedias.
BETHUNE—BAKER, *Trans. Zool. Soc., London*, XVII, 1, *p.* 124, *pl.* 3, *fig.* 4 ♂ (1903)	Arhopala	„

Swinhoe, *Lep. Ind.*, VIII, *p.* 189, *pl.* 684, *fig.* 3—36 (1910—11) . . . . . Arhopala Aedias.

Hewitson gives this species as occuring in Java, and Fruhstorfer caught it there also. To me it is unknown. The illustration is made from specimens belonging to Fruhstorfer.

15. Diardi Hew. (Pl. XXIV, 109).

Hewitson, *Cat. Lyc. Brit. Mus.*, *p.* 9, *No.* 43, *pl.* 5, *fig.* 41, 42 (1862) . . . . . Amblypodia Diardi.
Distant, *Rhop. Mal.*, *p.* 272, *Tab.* 23, *fig.* 14 (1882—86) Panchala „
de Nicéville, *Butt. of India*, III, *p.* 256 (1890) . . . Arhopala „
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1, *p.* 113, *pl.* 5, *fig.* 16, 16*a* (1903) . . . . . „ „
Swinhoe, *Lep. Ind.*, VIII, *p.* 196, *pl.* 687, *fig.* 1, 1*a*, 1*b* (1910—11). . . . . „ „
Fruhstorfer, *Neue Arhopala Rassen*, *Iris*, 1914, *p.* 131 „ „

W. J. Mountains in the Department Buitenzorg.
C. J.?
E. J. Tengger mts. (1200) (Jacobson).

Fruhstorfer, who distinguishes the Java form as Asatha, found it very common in E. J. up to a height of 700 metres.

16. Fulgida Hew. (Pl. XXIV, 110).

Hewitson, *III, Diurn. Lep.*, *p.* 11, *No.* 49, *pl.* 5, *fig.* 31 ♀ (1863). . . . . Amblypodia Fulgida.
Distant, *Rhop. Mal.*, *p.* 273 (1882—86). . . . . Panchala Singkapura.
de Nicéville, *Butt. of India*, III, *p.* 254 (1890) . . Arhopala Fulgida.
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1 *p.* 114 (1903) . . . . . „ „
Swinhoe, *Lep. Ind.*, VIII, *p.* 198, *pl.* 687, *fig.* 2, 2*a*, 2*b* (1910—11) . . . . . „ „
Fruhstorfer, *Neue Arhopala Rassen*, *Iris*, XXVIII, *p.* 12 (1914) . . . . . „ „

W. J. Mountains in the Department Buitenzorg.
C. J.?
E. J. Lawang (600) (Fruhstorfer).

FRUHSTORFER distinguishes the Java form, known to him by two ♀ only, as TENEA.

17. APIDANUS Cram. (Pl. XXIV, 111*a*, *b*, *c*).

CRAMER, *III*, *bld.* 63, *pl.* 137 *E. G.* (1779) . . .	Papilio	Apidanus.
STOLL, *Suppl. op Cramer*, *bld.* 166, *pl.* 37, *fig.* 4, 4*d* (1790)	„	„
HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 100, *No.* 32, *pl.* 4, *fig.* 3, 3*a* (1828)	Amblypodia	„
„ & MOORE, *Cat. Lep. E. I. C.*, I, *p.* 39, *pl.* 1, *fig.* 5, 5*a* (1857)	„	„
DISTANT, *Rhop. Mal.*, *p.* 273, *fig.* 85 (1882—86) . .	Panchala	„
DE NICÉVILLE, *Butt. of India*, III, *p.* 253	Arhopala	„
BETHUNE—BAKER, *Trans. Zool. Soc., London*, XVII, 1, *p.* 115, *pl.* 5, *fig.* 17, 17*a* (1903)	„	„
SWINHOE, *Lep. Ind.*, VIII, *p.* 200, *pl.* 688, *fig.* 1—1*c* (1910—11)	„	„
COURVOISIER, *Tijdschr. v. Ent.*, LV, *bld.* 18 (1912) .	„	„
FRUHSTORFER, *Neue Arhopala Rassen*, *Iris*, XXVIII, 2, *p.* 127 (1914)	„	„

W. J. Batavia (3—30); Depok (95); vicinity of Pelabouan Ratou or Wijnkoopsbay (± 150).

C. J. Goumboung (coll. COURVOISIER).

E. J. Without further indication of place of capture; Malang (443); Tengger mts. (FRUHSTORFER); (coll. COURVOISIER).

This species is very common, at any rate in W. J. FRUHSTORFER calls the form from E. J. ANTIPAXUS. Of the larva I give a very successful illustration, which by no means corresponds to the one in SWINHOE's work. The illustration given by HORSFIELD also is certainly not one of this species. I found the young larvae living gregariously on the young leaves of *boungour* (LAGERSTROEMIA spec.), *djamblang* (EUGENIA JAMBOLANA Lam.) and *gohok* (EUGENIA POLYCEPHALE Miq.), and also one larva on the leaf of *djambow ajer mawar* (EUGENIA JAMBOS L.). It is onisciform with a dark dorsal line, with a black dorsal patch on the first and last segments, upon which patch in the first segment are two milk-white dots. Along its sides a few white hairs protude. The pupa is light green, the thoracic portion angular, but without protuberances. It lies on a leaf upon a little tissue, attached also by a girdle-thread. A pupa from Nov. 29th produced a butterfly on Dec. 7th. The pupa sometimes contains Tachiin larvae.

18. Muta Hew. (Pl. XXIV, 112*a*, *b*).

Hewitson, *Cat. Lyc. Butt. Muss.*, *p.* 11, *No.* 50, *pl.* 6, *fig.* 57, 58 (1862) . . . . . Amblypodia Muta.
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1, *p.* 100, *pl.* 5, *fig.* 13, 13*a* (1903) . . . . . Arhopala „

In life this species has handsome metallic-green eyes.

W. J. Depok (95); Province of Krawang (Muller), province of Prayangan; Gedeh mts. (coll. Courvoisier).

C. J.?

E. J. Mount Semarou (750).

19. Perissa Doh. (Pl. XXIV, 113*a*, *b*).

Doherty, *Journ. As. Soc., Bengal*, 1889, *p.* 419, *pl.* 23, *fig.* 11 Arhopala Perissa.
de Nicéville, *Butt. of India*, III, *p.* 278 (1890). . . . „ „
Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 1, *p.* 137, *pl.* 3, *fig.* 11 ♂ (1903) . . . . . „ „
Swinhoe, *Lep. Ind.*, VIII, *p.* 230, *pl.* 694, *fig.* 2—26 (1910—11) „ „

W. J. Vicinity of the Tjiletou or Sandbay on the south coast (± 150).

C. J.?

E. J.?

The marking on underside of my specimens (1 ♂ 2 ♀) is very faint.

20. Weelii n. s. (Pl. XXIV, 114).

I name this species after the prematurely deceased entomologist Dr. van der Weele, who found the ♀ in the Prayangan mts. (1700). I also received three ♂ from the same district. As I give a good illustration of the last here, I do not think it necessary to give a description. There does not seem to be any difference between the sexes in colour or marking, only the ♀ mentioned above is considerably smaller than the three ♂, which is unusual; but whether this is the rule cannot be judged from one specimen.

21. Arvina Hew. (Pl. XXIV, 115*a*, *b*).

Hewitson, *Ill. Diurn. Lep. Lyc.*, *p.* 12, *pl.* 2, *fig.* 16, 17 ♂ (1865) . . . . . Amblypodia Arvina.
de Nicéville, *Journ. Bombay Nat. Hist. Soc.*, IX, *p.* 281, *pl. O*, *fig.* 26 ♂ (1895) . . . . . Arhopala Aboe.

BETHUNE—BAKER, *Trans. Zool. Soc., London*, XVII, 1, *p.* 147 (1903) . . . . . Arhopala Arvina.
SWINHOE, *Lep. Ind.*, VIII, *p.* 218, *pl.* 693, *fig.* 3—36 (1910—11) . . . . . „ „

This species was found in Java by FRUHSTORFER. The illustration is made from his specimens.

22. BUDDHA Beth.—Baker (Pl. XXIV, 116).

BETHUNE—BAKER, *Trans. Zool. Soc., London*, XVII, 1, *p.* 148, *pl.* 3, *fig.* 25 (1903) . . . . . Arhopala Buddha.

This species, of which one ♂ was found by FRUHSTORFER in the Gedeh mts. in W. J. is apparently the same as that of which I captured three ♀ on mount Semarou (750) in E. J. My specimens are described by SNELLEN under the name of ALETA i. l. thus:—

"This species is related to A. APHA, by the colour of the underside, which is less bright, more purple than purple-brown, while the marking is browner than the ground but not much darker, and the base spots are of the same colour as the others. The blue of the upperside in two of the specimens is somewhat lighter than in the illustration, in all towards the base of the wings a little greenish, and the nerve system dark, on the cross nerve of the primaries a rather thick black stripe. Outer margin black, very broad at the apex of the primaries, also on the costal margin of the secondaries. On the underside the whole inner margin of the primaries is lighter brownish grey, not sharply defined. The marking is a delicate light purple, edged with grey, the base spots of the secondaries small and indistinct, especially the first, the dark cross-band at two thirds obtusely broken, on the secondaries pretty well broken off. Marginal pattern divided fairly distinctly by a wavy light purple line. The inner angle of the secondaries only in the specimen reproduced having two faint black dots, which are decorated with a few shiny green scales.

23. AMMON Hew. (Pl. XXIV, 117*a*, *b*).

HEWITSON, *Cat. Lyc. Brit. Mus.*, *p.* 9, *No.* 41, *pl.* 5, *fig.* 49, 50 (1862) . . . . . Amblypodia Ammon.
DISTANT, *Rhop. Mal.*, *p.* 272, *No.* 19, *fig.* 83 (1882—86) Narathura „
DE NICÉVILLE, *Butt. of India*, III, *p.* 243 (1890) . . Arhopala „
ELWES, *Proc. Zool. Soc., London*, 1892, *p.* 630, *pl.* 44, *fig.* 7 „ Ammonides.

Bethune—Baker, *Trans. Zool. Soc., London*, XVII, 5, *p.* 143 (1903) . . . . . Arhopala Ammon.
Swinhoe, *Lep. Ind.*, VIII, *p.* 230, *pl.* 697, *fig.* 1, 1*a* (1910—11) . . . . . „ Ammonides.
Fruhstorfer, *Neue Arhopala Rassen, Iris*, XXVIII, 2, *p.* 137 (1914) . . . . . „ Ammon.

W. J. Megamendoung mts. (1500); Soukaboumi (602) (Fruhstorfer).
C. J.?
E. J. Semarou mts. (750).

I think it very doubtful whether Ammon and Ammonides are really two separate species. According to Bethune—Baker they can be very easily distinguished from one another. But as the only material I possess is 1 ♂ and 3 ♀ which I caught in Java, I cannot judge of this. The existing pictures are not sufficiently accurate. Fruhstorfer calls the Javan form Hammon.

Genus CURETIS Hbn. Moore.

1. Malayica Felder (Pl. XXIV, 118).

Felder, *Novara Lep., S.* 221, *Taf.* 28, *fig.* 18 (1867). . Anops Malayica.
Distant, *Rhop. Mal., p.* 202, *Tab.* 22, *fig.* 28 (1882—86) Curetis „
„ „ „ „ „ „ 24, „ 12, *pl.* 44, *fig.* 14 (1882—86) . . . . . „ Aesopus.
de Nicéville, *Butt. of India*, III, *p.* 294 (1890) . . . . „ Malayica.
Bingham, *Fauna of Brit. India, Butt.* II, *p.* 441, *fig.* 97 (1907) „ Bulis.
Swinhoe, *Lep. Ind.*, VIII, *p.* 247, *pl.* 700, *fig.* 3, 3*a*, 3*b*) (1910—11) . . . . . „ Malayica.

W. J. Mnt. Salak (780); mountains in the district Buitenzorg; vicinity of the Tjiletou or Sandbay on the south coast (150).
C. J.?
E. J. Without further indication of place of capture.
The form Aesopus Dist. has also been found in Java.
The larva and pupa are thus described by Bingham:
"Larva. About 16 mm. long, colour velvety green, head dark brown, 3rd and 4th segments with narrow obliquely placed lateral stripes of crimson, edged posteriorly with yellow; 6th to 11th segments with a slender longitudinal dorsal stripe of the same colour; the spiracles on each side surmounted by a slender

lunulated, pale yellow line, on the 9th segment a conspicuous quadrate patch of white between the spiracular yellow lunule and the crimson dorsal line; 12th and remaining segments dark green; on the 12th two greenish-yellow, erect, rigid processes seem to be pinkish brown in colour, with a tuft of black and white hairs at their spices; but it is not easy to note the colour of the hairs, as they are protruded, whirled round and withdrawn with great rapidity. There is no opening or honey gland on the 11th or other segment as in many Lycaenid larvae. In shape also these do not resemble the larvae of the Lycaenidae which, as a rule, are onisciform. In these the head is small and almost always completely hidden under the 2nd segment; the 3rd, 4th and 5th segments sloped upwards posteriorly, form each a well-marked transverse ridge.

Pupa. A rounded slightly convex disc with a protrusion posteriorly; colour translucent dark green. Seen under a magnifying glass they seem to be studded with tiny pits, except on the lateral areas; on the anterior portion there is an oval yellowish-white mark."

2. Sperthis Felder (Pl. XXIV, 119).

Felder, *Novara Lep.*, *S.* 222, *No.* 242 (1867) . . . . Anops Sperthis.

Snellen, although temporarily accepting this species, considers it very likely that it is the same as the preceding one.

W. J. Vicinity of the Tjiletou or Sandbay on the south coast (150).

C. J.?

E. J. Without further indication of place of capture.

3. Insularis Horsf. (Pl. XXIV, 120*a*, *b*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 125, *No.* 52 (1828) . Phaedra Insularis.
„ & Moore, *Id.*, I, *p.* 53, *pl.* 1*a*, *fig.* 14 (1857) Anops „
Distant, *Rhop. Mal.*, *p.* 451, *Tab.* 41, *fig.* 6, 7, *Tab.* 22, *fig.* 27 (1882—86). . . . . Curetis Sperthis.

Snellen thinks it not impossible that this species may be the same as C. Cinyra Cram. erroneously called C. Phoedrus F., to which also the C. Phoedrus F. of de Nicéville Butt. of India p. 286, pl. 27, fig. 201 ♂ would belong. Besides this de Nicéville mentions C. Thetis Drury as from Java, of which he describes minutely the egg, the larva—living upon young leaves of Derris Scandens Benth. and Heynea Trijuga Roxb.—and the pupa. Bingham and Swinhoe copy this from him. There seems, therefore, still to be some confusion here.

W. J. Gedeh mts. (1400); vicinity of the Tjiletou or Sandbay and Pelabouan Ratou or the Wijnkoopsbay on the south coast (150).

C. J.?

E. J. Malang (443); Province of Banyouwangy.

These three CURETIS really differ only in the greater or less extensiveness of the black on the red. Just as may be seem in some DEUDORIX species. And, as in these species, I think it very probable that here we merely have differing stadia of colour evolution present in the same species. In the same way as this occurs for instance in the Hesperide KORUTHAIOLOS XANITES Buttl.

Genus ZEPHYRUS Dalman.

1. ABSOLON Hew. (Pl. XXV, 121*a*, *b*).

HEWITSON, *Ill. Diurn. Lep.*, *p.* 265, *No.* 3, *pl.* 30, *fig.* 11, 12 (1865) . . . . . Dipsas Absolon.
DE NICÉVILLE, *Butt. of India*, III, *p.* 304 (1890) . . . Zephyrus „
„ *Journ. Bomb. Soc. of Nat. Hist.*, IX, *p.* 291, *pl. P*, *fig.* 33, 34 (1895) . . . . . „ „

W. J. Mnt. Megamendoung (1400); Prayangan mts. (1600).

C. J.?

E. J.?

2 ♂ and 1 ♀. The butterfly is not common.

Genus ILERDA Doubl.

1. EPICLES Gdt. (Pl. XXV, 122*a*, *b*).

GODART, *Enc. Meth.*, IX, *p.* 646, *No.* 109 (1819—23) Polyommatus Epicles.
HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 92, *No.* 25, *pl.* 1, *fig.* 3 ♀ (1828) . . . . . Thecla „
HÜBNER, *Zuträge*, *fig.* 785, 786 (1832) . . . . . Heliophorus Belenus.
DE NICÉVILLE, *Butt. of India*, III, *p.* 325 (1890) . . Ilerda Epicles.
SWINHOE, *Lep. Ind.*, VIII, *p.* 103, *pl.* 663, *fig.* 2—2*d* (1910—11) . . . . . Heliophorus „
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *S.* 252 (1911) Ilerda „
COURVOISIER, *Tijdschr. v. Ent.*, LV, *bld.* 19 (1912) . „ „

W. J. Soukamantry (525); Gedeh mts. (1400); mnt. Malabar (1600); mnt. Salak (780); mnt. Tjarymay in the Province of Tjirebon (700).

C. J. Prov. Tegal (Lucassen); Magelang (1500); Province of Madioun; mnt. Oungaran (700—1000) (Jacobson).

E. J. Mnt. Semarou (700); Tosari (1444); Tengger mts. (900—1200) (Jacobson, Fruhstorfer).

This butterfly is extremely common in Java, but is confined entirely to the mountains of more than 500 metres. Fruhstorfer calls the E. J. form Hillina to distinguish it from the W. J. form.

I can observe no difference between specimens from W. J. and from E. J. In this species the process of darkening of the orange on the upperside of the primaries shows very clearly and is quite individual. From the same district specimens are found in which the orange is still very distinct, beside others in which it has almost disappeared, in the same way as amongst the Hesperidae, in Koruthaiolos Xanites Butt. In the ♀ this orange is always much more extensive than in the ♂, but still varies individually. In many ♂ specimens the blue powdering on the upperside of the primaries has also disappeared.

Genus DEUDORIX Hew.

1. Lapithis Moore (Pl. XXV, 123*a*, *b*).

Horsfield & Moore, *Cat. Lep. E. I. C.*, I., *p.* 48, *No.* 79 (1857).	Myrina	Lapithis.
Hewitson, *Ill. Diurn. Lep.*, *p.* 36, *No.* 32, *pl.* 15, *fig.* 35—38 (1863).	„	„
Distant, *Rhop. Mal.*, *p.* 238, *Tab.* 20, *fig.* 29 (1882—86)	Biduanda	„
Swinhoe, *Lep. Ind.*, IX, *p.* 22, *pl.* 709, *fig.* 3—3*b* . .	„	„
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 237 (1911) .	Araotes	„

Fruhstorfer regards the Java specimens as a subspecies Archytas.

The illustration which Distant gives of the ♀ corresponds well with my Javan specimens, on the other hand de Nicéville's illustration of the ♂ does not.

W. J. Vicinity of the Pelabouan Ratou or Wijnkoopsbay on the south coast (150).

C. J.?

E. J. Without further indication of place of capture.

2. Malika Horsf. (Pl. XXX, 124*a*, *b*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 90, *No.* 22 (1828) . .	Thecla	Malika.
„ *and* Moore, *id.*, I, *p.* 37, *pl.* 1*a*, *fig.* 5 (1857)	Dipsas	„
Hewitson, *Ill. Diurn. Lep.*, *p.* 37, *pl.* 15, *fig.* 41—42 (1863)	Myrina	„
Distant, *Rhop. Mal.*, *p.* 461, *Tab.* 44, *fig.* 20 ♀ (1882—86)	Sinthusa	Amata.
de Nicéville, *Journ. Asiat. Soc. of Bengal*, LXIII, *p.* 43, *pl.* 5, *fig.* 6, 18 (1891)	„	Malika.
„ *Journ. Asiat. Soc. of Bengal*, LXIII, *p.* 44, *pl.* 15, *fig.* 17 (1891)	„	Aspra.
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 229 (1911). .	„	Malika.

Fruhstorfer wishes to distinguish two subspecies of this species, one Malika from W. J. and the other Volsa from E. J. I am familiar with specimens of both sexes both from W. J. and E. J., but can see nothing but individual differences in them. Snellen does not recognize as a separate species the ♀ form Aspra, as Doherty and de Nicéville do. Indeed there are specimens which must be regarded as transitions, and the only difference consists in a somewhat greater extent of white in Aspra, which is nothing but a phenomenon of colour evolution, so far only appearing in some individuals. This form occurs both in W. J. and in E. J.

W. J. Tjampea (160); Buitenzorg (265); Soukaboumi (607); (Fruhstorfer); vicinity of the Pelabouan Ratou or Wijnkoopsbay (150); (Fruhstorfer).

C. J.?

E. J. Mnt. Ardjouno (1500); mnt. Semarou (600); Province of Pasarouan; Lawang (500) (Fruhstorfer); mountains along the south coast (Fruhstorfer).

3. Nasaka Horsf. (Pl. XXV, 125).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 91, *No.* 23 (1828).	Thecla	Nasaca.
Hewitson, *Ill. Diurn. Lep.*, *p.* 24, *pl.* 5, *fig.* 45, 46 (1863)	Deudorix	„
Kirby *in id. Suppl.*, *p.* 32, *pl.* 5*b*, *fig.* 44, 46 (1848)	Hypolycaena	Amba.
de Nicéville, *Journ. As. Soc. of Bengal*, LII, *p.* 77, *pl.* 9, *fig.* 2 ♀ (1883).	„	Nasaka.
Distant, *Rhop. Mal.*, *p.* 461, *Tab.* 44, *fig.* 12, 19 (1882—86)	Sinthusa	Amba.
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 228 (1911)	„	Nasaka.
Swinhoe, *Lep. Ind.*, IX, *p.* 14, *pl.* 708, *fig.* 1, 1*a*, 1*b* (1911—12)	„	„

W. J. Vicinity of the Pelabouan Ratou or Wijnkoopsbay on the south coast (150).

C. J.?

E. J. Without further indication of place of capture; Tengger mts. (FRUHSTORFER).

4. KESSUMA Horsf. (Pl. XXV, 126*a*, *b*).

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 89, *No.* 21 (1828).	Tecla	Kessuma.
HEWITSON, *Ill. Diurn. Lep.*, VIII, *p.* 31, *pl.* 5*a*, *fig.* 69 (1828)	Deudorix	Deliochus.
DE NICÉVILLE, *Butt. of India*, III, *p.* 457 (1890) . . .	Rapala	„
„ *Journ. Bombay Soc. of Nat. Hist.*, V, *p.* 212, *pl. E*, *fig.* 6 (1890).	„	„
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *S.* 257 (1911)	„	Kessuma.

W. J. Batavia (3—14): without further indication of place of capture.

C. J.?

E. J. Tengger mts. (700) (FRUHSTORFER).

5. PHERETIMA Hew. (Pl. XXV, 127).

HEWITSON, *Ill. Diurn. Lep.*, *p.* 21, *pl.* 9, *fig.* 27—29 (1863)	Deudorix	Pheretima.
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *S.* 263 (1911)	Rapala	„

Of this species, the ♂ of which is also reproduced by HEWITSON, I possess only one ♀ from W. J.

FRUHSTORFER sees in the Javan form the subspecies Sakaia.

W. J. Without further indication of place of capture.

C. J.?

E. J. Lawang (500) (FRUHSTORFER); Tengger mts. (coll. COURVOISIER).

6. UTIMUTIS Dist. (Pl. XXV, 128).

DISTANT, *Rhop. Mal.*, *p.* 279, *Tab.* 23, *fig.* 22 ♂ (1882—86)	Deudorix	Utimutis.
DE NICÉVILLE, *Butt. of India*, III, *p.* 466 (1890) . . .	Rapala	„

Of this species I possess one ♀ caught in the vicinity of the Pelabouan or Wijnkoopsbay on the south coast.

7. Sphinx F. (Pl. XXV 129*a*, *b*, *c*, *d*).

Fabricius, *Syst. Ent.*, *p.* 520, *No.* 326 (1775)	Papilio	Sphinx.
Hewitson, *Ill. Diurn. Lep.*, *p.* 22, *pl.* 9, *fig.* 32, 33, *pl.* 10, *fig.* 36, 37 (1863)	Deudorix	Varuna.
Butler, *Cat. Diurn. Lep. Brit. Mus.*, *p.* 180, *No.* 3, (1869)	„	Sphinx.
de Nicéville, *Butt. of India*, III, *p.* 458 (1890). . . .	Rapala	„
„ *Journ. Bombay Soc. of Nat. Hist.*, *S.* 10, *pl.* 14, *pl. T*, *fig.* 40 (1896)	„	Phoecus.
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 256 (1911) .	„	Sphinx.
Swinhoe, *Lep. Ind.*, IX, *p.* 48, *pl.* 715, *fig.* 3, 3*a*, 3*b* (1911—12)	„	„
Courvoisier, *Tijdschr. v. Ent.*, LV, *bld.* 19 (1912). . .	„	„

W. J. Batavia (3—14); Depok (95); Tjampea (160); Buitenzorg (265); Soukapoura (70); Patjet (1114).

C. J.?

E. J. Tengger mts. (1200) (Jacobson).

The larva on *dourèn-dourènan* (Elaeagnus Ferruginea Rich.) also called *kekadouan*, and on *sengani* (Melastoma Polyanthus Bl.) against the silvery underside, of whose leaves it lies flat and is difficult to distinguish from them. It resembles a cocliopodes larva even more than so many other Lycaenid larvae do. It also has protruding prickles at the sides, like some of the former larvae. It is very light greenish yellow with a dorsal line, which is either dark green, or consists of alternate dark green and red or reddish brown partitions. Sometimes there are also fine white and red spots on the back. On all sides there are horizontal wort-like protrusions covered with stiff red hairs. The stigmata are also red or brown. The pupa is flat and broad, attached to the leaf by a girdle-thread.

8. Orseis Hew. (Pl. XXV, 130*a*, *b*, *c*, *d*).

Hewitson, *Ill. Diurn. Lep.*, *p.* 23, *No.* 20 (1863) . .	Deudorix	Orseis.
Moore, *Proc. Zool. Soc., London*, 1879, *p.* 140 . . .	„	Grisea.
de Nicéville, *Butt. of India*, III, *p.* 461 (1890) . . .	Rapala	Orseis.
„ „ „ „ „ „ 462 „ . .	„	Grisea.
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 255 (1911)	„	Schistacea.
Courvoisier, *Tijdschr. v. Ent.*, LV, *bldz.* 19 (1912). .	„	„

Fruhstorfer inclines to distinguish two forms for W. J. and E. J. as *Belata* and *Renata*. I find his differences just as much amongst specimens from W. J. and no difference between these and ones from E. J. There is

great confusion between these and the related species, arising in a great measure from the fact that the differences between the species are usually very slight, and therefore demand very accurate illustrations, while most of these are by no means accurate. I shall endeavour to meet this difficulty by giving careful reproductions. ORSEIS ♂ usually has a large part of the upperside dark blue, but sometimes also dark brown; the underside is often dark, with a intense purple metallic shine, but is also sometimes of a much lighter colour without metallic shimmer. The ♀ is on the upperside more or less dark grey and on the underside grey also, sometimes lighter in colour and always without metallic shine. The markings on the underside are the same in both sexes.

W. J. Batavia (3—14); Buitenzorg (265); mnt. Salak (780); Soukaboumi (600).

C. J. Serondol (210) (JACOBSON).

E. J. Province of Banyouwangy; Lawang (500) (FRUHSTORFER); Tengger mts. (680) (FRUHSTORFER).

The larvae feed on the flowers of *tjinté*, *tjintamanis* or *tai ajam* (LANTANA CAMARA L.), also on young *ramboutan* leaves (NEPHELIUM LAPPACEUM L.), and ALBIZZIA STIPULATA Boiv., as well as other leaves. They are very light green, but the 1st abdominal and the 11th segment are dark brown, which however only appears at the lest moulting and is not equally distinct in all larvae. The back is very angular, difficult to describe, each segment has on each side a spike. The pupa is of the usual Lycaenid form, mottled dark brown or dark green, with very slightly pointed tail end; it is attached by a girdle-thread. A pupa of July 2nd produced a butterfly on July 12th.

9. VARUNA Horsf. (Pl. XXV, 131*a*, *b*).

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 971, *No.* 24 (1828) . . Thecla Varuna.

VARUNA ♂ can hardly be distinguished on the upperside from the former species, the ♀ also resemble each other greatly in this respect, although VARUNA is lighter and more greyish. But the marking on the underside differs very distinctly from that of ORSEIS; it consists of much thicker lines, especially on the underside of the primaries, which sometimes even partially melt into one and thus form a patch. There is individual variety in this, but always the same system.

W. J. Batavia (3—14); Depok (95); vicinity of the Tjiletou or Sandbay on the south coast (150).

C. J?

E. J. Mnt. Ardjouno (HEKMEYER); without further indication of place of capture.

10. Sagata Fruhs. (Pl. XXV, 132).

Fruhstorfer, *Deutsche Ent. Zeitschr. Iris*, 1913, IV, *S.* 178 Rapala Sagata.
„ *Uebersicht d. Lyc. Berl. Ent. Zeitschr.*, LVI, 1911,
S. 258. . . . . Varuna „

I possess one specimen, captured at Batavia (3—14) W. J., not sufficient material therefore to judge the correctness of Fruhstorfer's assumption of this as a separate species, which I accept for the present, on his authority.

11. Jarbas F. (Pl. XXV, 133*a*, *b*).

Fabricius, *Mant. Ins.*, II, *p.* 68, *No.* 648 (1787) . . Papilio Jarbas.
Donovan, *Ins. of India*, *pl.* 40, *fig.* 3 (1800). . . . „ „
Horsfield, *Cat. Lep. E. I. C.*, *p.* 93, *pl.* 4, *fig.* 2*a—c* (1828) Thecla „
Distant, *Rhop. Mal.*, *p.* 278, *Tab.* 24, *fig.* 15 ♂, *Tab.* 20,
fig. 26 ♀ (1882—86) . . . . . Deudorix „
de Nicéville, *Butt. of India*, III, *p.* 468 (1890). . . Rapala „
Swinhoe, *Lep. Ind.*, IX, *p.* 39, *pl.* 713, *fig.* 1—1*c* (1911) „ „
Fruhstorfer, *Deutsch. Ent. Zeitschr.*, *Iris*, 1913, IV, *S.* 177 „ Dekaiarchus.

There is some confusion with regard to this species. As Swinhoe correctly remarks, the Melampus of Cramer and Fabricius' Jarbas are two species and in that case the Java species is Jarbas, more especially of the form which Fruhstorfer distinguishes as Dekaiarchus Yahala.

W. J. Batavia (3—14); Bidara tjina (28); Buitenzorg (265); vicinity of the Pelabouan Ratou or Wijnkoopsbay (150).

C. J.?

E. J. Jember (98); mnt. Semarou (700); Tengger mts. (750).

The species is not uncommon in Java. The larva feeds upon the very young juicy leaves of the *ramboutan* (Nephelium Lappaceum L.) and on the flowers of *senggani* (Melastoma Polyanthum Bl.). In shape it strongly resembles that of D. Orseis Hew.; but is usually dark red in colour, although I think that yellowish green specimens occur, but I am not certain that I have not confused these with the larvae of D. Orseis Hew. It is very cannibalistic, and eagerly devours individuals of its own species, if it can attack them during the process of pupation, when the larva skin is shed off, but the pupa not yet hardened. The pupa also resembles that of D. Orseis Hew. A larva pupated on Nov. 29th produced the imago on Dec. 8th.

12. Barthema Dist. (Pl. XXV, 134*a*, *b*).

Distant, *Rhop. Mal.*, *p.* 280 ♀ (1882—86)	Deudorix	Barthema.
Druce, *Proc. Zool. Soc. of London*, 1895, *p.* 623, *pl.* 34, *fig.* 11 ♂	Rapala	„
de Nicéville, *Butt. of India*, III, *p.* 450 (1890) . . .	Deudorix	„
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 256 (1911).	Rapala	„

Fruhstorfer sees in the Javan specimens a subspecies Litania.

W. J. Vicinity of the Pelabouan Ratou or Wijnkoopsbay on the south coast (150).

C. J.?

E. J. Without further indication of the place of capture; Lawang (700) (Fruhstorfer); Tengger mts. (Coll. Courvoisier).

13. Xenophon F. (Pl. XXV, 135*a*, *b*).

Fabricius, *Ent. Syst.*, III, 1, *p.* 272, *No.* 47 (1793)	Hesperia	Xenophon.
Godart, *Enc. Meth.*, IX, *p.* 640, *No.* 85 (1819—23)	Polyommatus	„
Horsfield, *Cat. Lep. E. I. C.*, *p.* 94, *No.* 27 (1829)	Thecla	„
„ *and* Moore, *Cat. Lep. E. I. C.*, *p.* 31, *pl.* 1, *fig.* 3, 3*a* (1851).	Dipsas	„
Hewitson, *Ill. Diurn. Lep. Suppl.*, *p.* 31, *No.* 35 (1878)	Deudorix	Dieneces.
Distant, *Rhop. Mal.*, *p.* 465, *Tab.* 44, *fig.* 1, 2 (1882—86)	„	Xenophon.
de Nicéville, *Butt. of India*, III, *p.* 470 (1890). .	Rapala	„
Swinhoe, *Lep. Ind.*, IX, *p.* 43, *pl.* 714, *fig.* 2—2*c* (1911—12)	„	„
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 260 (1911)	„	Dieneces.
„ „ „ „ „ „ „ „	„	Xenophon.
„ *Iris*, 1913, *S.* 177 (1914)	„	„
Courvoisier, *Tijdschr. v. Ent.*, LV, *bld.* 19 (1912).	„	Dieneces.

W. J. Vicinity of the Tjiletou or Sandbay on the south coast (550); without further indication of place of capture (510—700) (Fruhstorfer).

C. J. Serondol (200) (Jacobson).

E. J. Tengger mts. (500—700) (Fruhstorfer).

Fruhstorfer distinguishes the Javan form as suffusa praxeas.

The following description of the larva and the chrysalis is borrowed from Horsfield's illustrations made in Java.

"Larva varies at different periods in colour from yellow with a greenish

cast, to dark ferrugineous-brown and at one period the lateral bands are very obscure. Feeds on SCHMIEDELIA RACEMOSA. Head rather large, segments increasing in size from the second to the fifth, thence to anal segment of equal size, with a subdorsal and lateral row of short tubercles bearing clumps of short closely—set bristly hairs; the body just above the legs fringed with hairs; there is a narrow black dorsal line, the segments blotched with black, a subdorsal reddish band. Pupa very rounded, the head and anal segment bluntly pointed, brown sprinkled with darker brown and reddish marks".

14. ABNORMIS Elwes (Pl. XXV, 136).

ELWES, *Proc. Zool. Soc.*, 1892, *p.* 642, *pl.* 44, *fig.* 2 ♂ .	Rapala	Abnormis.
SWINHOE, *Lep. Ind.*, IX, *p.* 62, *pl.* 719, *fig.* 2, 2*a*. . .	„	„

FRUHSTORFER calls the Java form ABUSINA and caught 4 ♂ in W. J.

15. DIARA Swinhoe (Pl. XXV, 137).

SWINHOE, *Ann. Mag. Nat. Hist.*, 1896, *p.* 337	Deudorix	Diara.
„ *Lep. Ind.*, IX, *p.* 34, *pl.* 712, *fig.* 1, 1*a*, 1*b* (1911—12)	„	„
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *p.* 264 (1911) . .	„	„

FRUHSTORFER states that he found this species both in W. J. and in E. J. at a height of ± 700 metres. In coll. COURVOISIER there is also a specimen from the Gedeh mountains in W. J.

16. HYPARGYRIA Elwes (Pl. XXV, 138).

ELWES, *Proc. Zool. Soc. of London*, 1892, *p.* 643, *pl.* 43, *fig.* 7	Rapala	Hypargyria.
SWINHOE, *Lep. Ind.*, IX, *p.* 36, *pl.* 712, *fig.* 3, 3*a* (1911—12)	Deudorix	„
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *p.* 364 (1912)	„	„

FRUHSTORFER states that he found this species in the vicinity of Soukaboumi (650) in W. J.

17. EPIJARBAS Moore (Pl. XXV, 139*a*, *b*).

MOORE, *Cat. Lep. E. I. C.*, I, *p.* 32, *No.* 40 (1857) . .	Dipsas	Epijarbas.
HEWITSON, *Ill. Diurn. Lep.*, *p.* 20, *pl.* 7, *fig.* 16—18 (1863)	Deudorix	„
MOORE, *Lep. of Ceylon*, I, *p.* 103, *pl.* 39, *fig.* 4, 4*a* (1881)	„	„
DISTANT, *Rhop. Mal.*, *p.* 464, *Tab.* 41, *fig.* 5 (1882—86)	„	„
STAUDINGER, *Exot. Schm.*, *S.* 278, *Tab.* 96 (1888). . .	„	„

Semper, *Schmett. d. Phil.*, I, *S.* 221 (1890)	Deudorix	Epijarbas.
de Nicéville, *Butt. of India*, III, *p.* 449, *pl.* 29, *fig.* 23 (1890)	„	„
„ *Journ. Bombay Soc. of Nat. H.*, XVI, *pl. T*, *fig.* 40, 44 (1891).	„	Rhoda.
Druce, *Proc. Zool. Soc. of London*, 1895, *p.* 621, *pl.* 34, *fig.* 10	Deudorix	Staudingeri.
Swinhoe, *Lep. Ind.*, IX, *p.* 33, *fig.* 3—3*c* (1911—12)	„	Epijarbas.
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 265 (1911)	„	„

Fruhstorfer calls the Javan form Cinnabarus.

In various Deudorix species the antennae of the ♂ are very long, longer than of the ♀; in this species it is very striking.

W. J. Batavia (3—14); Buitenzorg (265); Tjampea (160); Soukaboumi (600).

C. J.?

E. J. Lawang (500); Tengger mts. (coll. Courvoisier).

I once found the larva in the fruit of the *ramboutan* (Nephelium Lappaceum L.). It was dark red, claret colour; on the back of the first thoracic segments yellowish with rows of pits lengthwise; it changed outside the fruit into a pupa of the ordinary Lycaenid form. This very superficial description, hastily made at the time, does not quite correspond to the complete description of it communicated by Swinhoe, nor with his illustrations, in which the pupa also is shown inside the pomegranate.

18. Rhode de Nic. (Pl. XXVI, 141).

de Nicéville, *Journ. Bombay N. H. Soc.*, *p.* 184, *pl. T*, *fig.* 43, 44	Rapala	Rhoda.
Fruhstorfer, *Iris*, 1913, *S.* 118 (1914)	„	„

Fruhstorfer has found the Javan form of this species, which he distinguishes as Sarata, both in E. J. and in W. J.

19. Ignota n. s. (Pl. XXVI, 141).

The single specimen here reproduced was found by me in W. J.

Genus SITHON Hbn.

1. Nedymond Cram. (Pl. XXVI, 142*a*, *b*, *c*).

Cramer, *IV*, *bld.* 19, *pl.* 299, *E. F.* ♂ (1782) . . .	Papilio	Nedymond.
Horsfield, *Cat. Lep. E. I. C.*, *p.* 97, *pl.* 1, *fig.* 5 ♀ (1828)	Thecla	Chitra.
Distant, *Rhop. Mal.*, *p.* 253, *Tab.* 22, *fig.* 1 ♂ (1882—86)	Sithon	Nedymond.
„ „ „ „ 254, „ 23, „ 15*a* ♀ „ „	„	Chitra.
Staudinger, *Exot. Schm.*, *S.* 277, *Tab.* 95♂ (1884—88)	„	Nedymond.
Swinhoe, *Lep. Ind.*, IX, *p.* 219, *pl.* 745, *fig.* 3, 3*a*, 3*b*	„	„
Fruhstorfer, *Berl. Ent. Zeit.*, LVI, *S.* 225 (1911) . .	„	„
Courvoisier, *Tijdschr. v. Ent.*, LV, *bld.* 18 (1912) . .	„	„

Fruhstorfer distinguishes the E. J. specimens as subspecies Chitra from those of W. J. I cannot, however, find the differences which he gives, in my specimens from E. J. and W. J.; they must be individual variations, not connected with a particular district.

W. J. Buitenzorg (265); Tjampea (160); Prayangan mts.; Soukaboumi (650) (Fruhstorfer); vicinity of the Pelabouan Ratou or Wijnkoopsbay and the Tjiletou or Sandbay on the south coast (150); Province of Krawang (Muller).

C. J. Nousa Kambangan on the sea shore of the south coast (Jacobson).

E. J. Lawang (500); province of Pasourouan.

For the remarkable difference of colour between the sexes of this species, see the Introduction.

I found the larva once on a plant, the name of which I do not know. It was covered with two rows of lumps, one subdorsal and one on the edge of the abdomen, these lumps were, however, absent from the first and anal segments; from each lump there protruded 4 short stiff black hairs. The colour was yellowish white mixed with much handsome dark blue. It changed into a large fat pupa, but of the usual Lycaenid form, attached to a leaf, dark brown, but the back almost entirely ochre. On the abdomen there are many tufts of stiff short hairs.

Genus JOLAUS Hbn.

1. Vidura Horsf. (Pl. XXVI, 143*a*, *b*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 113, *No.* 45 (1828).	Amblypodia	Vidura.
„ „ „ „ „ „ *pl.* 1, *fig.* 6, 6*a* . . .	Thecla	„
Druce, *Proc. Zool. Soc. of London*, 1895, *p.* 595 . .	Dacalana	„
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 205 (1911).	„	„

W. J. Buitenzorg (265); Tjampea (160); Gedeh mts. (coll. COURVOISIER); vicinity of the Pelabouan Ratou or Wijnkoopsbay and Tjiletou or Sandbay on the south coast (150).

C. J.?

E. J. Up to 700 m. without further indication of place of capture (FRUHSTORFER); Lawang (500) (coll. COURVOISIER).

According to FRUHSTORFER the form from E. J. which he distinguishes as BAGANDA, is smaller than that from W. J. I do not know the former.

2. COTYS Hew. (Pl. XXVI, 144).

HEWITSON, *Ill. Diurn. Lep.*, *p.* 43, *pl.* 19, *fig.* 19, 20 (1863)	Jolaus	Cotys.
DE NICÉVILLE, *Journ. Asiat. Soc. of Bengal*, LXIII, *p.* 37, *pl.* 5, *fig.* 16 ♂ (1894)	Camena	Cremera.
SWINHOE, *Lep. Ind.*, IX, *p.* 147, *pl.* 731, *fig.* 4, 4*a*, 4*b* (1911—12)	Pratapa	Cotys.

FRUHSTORFER found this species, called by him subspecies CREMERA, in W. J. and SNELLEN saw a specimen, also from W. J. from the collection STAUDINGER. In the collection COURVOISIER there is also a specimen from Soukaboumi (605) W. J. I do not know the species myself, but to judge by the accompanying illustration of the ♂, which FRUHSTORFER had made for me, the difference with the ♂ of the former species seems to me very insignificant.

3. MANTRA Felder (Pl. XXVI, 145).

FELDER, *Wien. Ent. Monatschr.*, IV, *S.* 396, *No.* 9 (1860)	Pseudolycaena	Mantra.
„ *Novara Lep.*, II, *S.* 238, *Taf.* 30, *fig.* 14 ♂ (1867)	Myrina	„
HEWITSON, *Ill. Diurn. Lep.*, *p.* 46, *pl.* 20, *fig.* 24 (1865)	Jolaus	„
SWINHOE, *Lep. Ind.*, IX, *p.* 107, *pl.* 125, *fig.* 3, 3*a*, 3*b* (1911—12)	Tajuria	„
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *S.* 212 (1911)	„	„

FRUHSTORFER calls the Javan form MESAMBRIA. He collected 6 specimens of it in W. J. without further indication of place of capture. SNELLEN saw a specimen from the collection STAUDINGER, from which the illustration is made.

4. CLEOBIS Godt. (Pl. XXVI, 146*a*, *b*, *c*, *d*).

GODART, *Enc. Meth.*, IX, *p.* 634, *No.* 61 (1819—23)	Polyommatus	Cleobis.
MOORE, *Cat. Lep. E. I. C.*, I, *p.* 45 (1857) . . .	Amblypodia	Hypatada.

HEWITSON, *Ill. Diurn. Lep.*, *p.* 43, *pl.* 18, *fig.* 8, 9 ♂ (1865)	Jolaus	Cleobis.
„ „ „ „ „ „ „ 19, „ 15, 16 ♀ „	„	Ister.
DE NICÉVILLE, *Butt. of India*, III, *p.* 343 (1890)	Camana	Cleobis.
„ „ „ „ „ „ 344 „	„	Ister.
„ *Journ. Nat. Hist. Soc. Bombay*, X, *p.* 11 (1895)	Creon	Cleobis.
SWINHOE, *Lep. Ind.*, IX, *p.* 138, *pl.* 730, *fig.* 1—1*e* (1911—12)	„	„
„ „ „ „ „ 146, „ 731, „ 3, 3*a*, 3*b* „	Pratapa	Ister.
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *S.* 205 (1911) . .	Camana	„

FRUHSTORFER calls the specimens from W. J. *Cretheus*, those from E. J. *Ecphantus*.

W. J. Batavia (3—14); Tjampea (160); without further indication of place of capture (FRUHSTORFER).

C. J.?

E. J. Lawang (500) (FRUHSTORFER).

The larva on *pasilan* (LORANTHUS Spec.) is of a strange form, of which I give a fairly successful illustration here. It is slippery and shiny; the colour varies slightly in individuals, sometimes the abdomen is not green, but shiny black. The pupa, attached on the top of a leaf, is strongly arched. A pupa from March 7th produced a butterfly on March 17th, one from Nov. 3rd a butterfly on Nov. 12th.

5. DOMINUS Druce (Pl. XXVI, 147*a*, *b*).

DRUCE, *Proc. Zool. Soc. of London*, 1895, *p.* 600, *pl.* 33, *fig.* 12	Tajuria	Dominus.
„ „ „ „ „ „ 1896, „ 673	„	„

W. J. Batavia (3—14), Tjampea (160), Province of Prayangan.

C. J.?

E. J.?

This species is closely related to the preceding one, the ♀ differs from the ♂, as in that species, only in a fainter colouring of the upperside. But the blue of the ♂ is there very brilliant and metallic, which is not the case with CLEOBIS, and DOMINUS is as a rule smaller than that species. A very clear and constant difference which appears in both sexes, consists herein, that a dark vertical line on the underside of the primaries in DOMINUS is considerably further from the outer margin and therefore more in the middle of the wing, than in CLEOBIS. The larvae, also, although living on the same plant and having the same strange shape, differ from eachother in colour. A small light green larva, mottled with greenish-white lines, a white line along the

border of the abdomen and a few dorsal brown dots, became later on white with brownish green mottling, while the brown spot peculiar to the larva of CLEOBIS was absent. The pupa, also of the same shape as that of CLEOBIS, was dark brown and milk-white at the sides. Larva and pupa of the two species, nothwithstanding the similarity in shape, differed so much that in my notes I find my surprise expressed that I got the same butterfly from it, nothwithstanding. This was not actually the case, but a ♀ of DOMINUS which greatly resembled that of CLEOBIS, and of which at that time I did not yet know the two distinguishing characteristics. From the pupa of Nov. 3rd the imago emerged on Nov. 12th.

6. LONGINUS F. (Pl. XXVI, 148*a*, *b*, *c*, *d*).

FABRICIUS, *Ent. Syst. Suppl.*, *p.* 430 (1798). . . .	Hesperia	Longinus.
HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 110, *No.* 42 (1828)	Amblypodia	„
„ „ „ „ „ „ *pl.* 1, *fig.* 7 ♂, *pl.* 4, *fig.* 5*a*—*c* (1828).	Thecla	„
HÜBNER, *Zuträge*, *fig.* 933, 34 (1837)	Bithys	„
HORSFIELD *and* MOORE, *Cat. Lep. E. I. C.*, I, *p.* 45, *pl.* 1, *fig.* 6, 6*a* (1857)	Amblypodia	Pseudolonginus.
DISTANT, *Rhop. Mal.*, *p.* 222, *Tab.* 23, *fig.* 20 ♀ (1882—86)	Tajuria	Longinus.
STAUDINGER, *Exot. Schm.*, *S.* 275, *Taf.* 95 ♂ (1884—88)	Jolaus	„
DE NICÉVILLE, *Butt. of India*, III, *p.* 376 (1890) . .	Tajuria	„
SWINHOE, *Lep. Ind.*, IX, *p.* 104, *pl.* 725, *fig.* 2—2*c* (1911—12).	„	Cippus.
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *S.* 211 (1911)	„	„

FRUHSTORFER calls the form from Java PSEUDOLONGINUS.

The upperside of the ♀ is much more bluish in one individual than in another.

W. J. Batavia (3—14); mnt. Gedeh; without further indication of place of capture (FRUHSTORFER).

C. J.?

E. J. Mnt. Ardjouno (HEKMEYER); Tengger mts. (coll. COURVOISIER); without further indication of place of capture.

I give here very satisfactiory illustrations of the roof-shaped larva, the anterior part of which is higher than the posterior portion, and which lived upon the young leaves of *pasilan* (LORANTHUS Spec.); and also of the pupa, lying close against the leaf, where I could not discover any girdle-thread. A

pupa from Jan. 3rd produced an imago on Jan. 23rd, one from Feb. 14th on Feb. 24th, one from March 4th on March 16th, one from Sept. 3rd on Sept 19th.

7. Cippus F. (Pl. XXVI, 149).

Fabricius, *Ent. Syst. V. Suppl.*, *p.* 429, *No.* 43—44 (1798)	Hesperia	Cippus.
de Nicéville, *Butt. of India*, III, *p.* 340 (1890). . . .	Camena	„
Swinhoe, *Lep. Ind.*, IX, *p.* 141, *pl.* 730, *fig.* 3—3*b* (1911)	Pratapa	Argentea.
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *p.* 207 (1911) .	Camena	Lucides.

Fruhstorfer captured 3 ♂ of this species in W. J.

8. Deva Moore (Pl. XXVI, 150).

Moore, *Cat. Lep. E. I. C.*, *p.* 46 (1857).	Amblypodia	Deva.
Hewitson, *Ill. Diurn. Lep.*, *p.* 42, *pl.* 18, *fig.* 2—5 (1865)	Jolaus	„
de Nicéville, *Butt. of India*, III, *p.* 341 (1890) . . .	Camena	„
„ „ „ „ „ „ 342.	„	Lila.
Semper, *Schmett. d. Phil.*, I, *S.* 207 (1890)	Ratapa	Deva.
Druce, *Proc. Zool. Soc. of London*, 1895, *p.* 596, *pl.* 33, *fig.* 45	„	Devana.
de Nicéville, *Journ. Bomb. Soc. of Nat. Hist.*, XI, *p.* 385, *pl. V*, *fig.* 16*a*—*d* (1898)	Camena	„
Swinhoe, *Lep. Ind.*, IX, *p.* 143, *pl.* 730, *fig.* 4—4*c* (1911—12)	Pratapa	„
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 206 (1911) .	Camena	„

Fruhstorfer distinguishes the specimens from W. J. as Cartena and those from E. J. as Methara.

W. J. Without further indication of place of capture (Fruhstorfer).

C. J.?

E. J. Without further indication of place of capture. Vicinity of Lawang (750) (Fruhstorfer).

The larva and pupa were drawn by Swinhoe. The former is supposed to live upon Loranthus Longiflorens Desr.

9. Relata Dist. (Pl. XXVI, 151).

Distant, *Rhop. Mal.*, *p.* 246, *pl.* 21, *fig.* 12 (1882—86)	Tajuria	Relata.
Semper, *Schmett. d. Phil.*, I, *S.* 209 (1890)	„	„
de Nicéville, *Journ. Bombay Nat. Hist. Soc.*, IX, *p.* 294, *pl. P*, *fig.* 35 (1895)	Camena	Cretheus.

DE NICÉVILLE, *Journ. Bombay Nat. Hist. Soc.*, X, *p.* 7, *pl. T, fig.* 35 (1895) . . . . . Camena Cretheus.
DRUCE, *Proc. Zool. Soc. of London*, 1895, *p.* 598, *pl.* 33, *fig.* 6, 7 . . . . . Rapala Calculis.

FRUHSTORFER takes this species to be a form of his TAJURIA ISAEUS Hew. SNELLEN on the other hand considers ISAEUS Hew. to be a different species, namely a modified form of HYPOLYCAENA, his minute description of which I shall therefore give when dealing wit the latter. He further notes that the ♂ specimen of RELATA from E. J. in our collection corresponds very well to the illustration of CRETHEUS published by DE NICÉVILLE, and of CALCULIS by DRUCE.

W. J. Soukaboumi (600); (DE NICÉVILLE).

C. J.?

E. J. Without further indication of place of capture.

10. DIAEUS Hew. (Pl. XXVI, 152*a*, *b*).

HEWITSON, *Ill. Diurn. Lep.*, *p.* 45, *pl.* 20, *fig.* 26—28 (1865)	Jolaus	Diaeus.
DE NICÉVILLE, *Butt. of India*, III, *p.* 378 (1890)	Tajuria	„
„ *Journ. Bombay Nat. Hist. Soc.*, X, *p.* 387 (1898)	„	„
DRUCE, *Proc. Soc. Zool. of London*, 1896, *p.* 694 (*note*), *pl.* 31, *fig.* 4, 5	„	Dacia.
SWINHOE, *Lep. Ind.*, IX, *p.* 115, *pl.* 726, *fig.* 6, 6*a*, 6*b* (1911—12)	„	Diaeus.

W. J. Prayangan mts. (SIJTHOFF); Gedeh mts. (FRUHSTORFER).

C. J.?

E. J.?

In the collection STAUDINGER SNELLEN saw a ♂ from Java, without further indication of place of capture.

SWINHOE gives a full description of the life of this species. As it is very long I refer the reader to it for himself, only quoting from it that the larva lives upon LANTANA BICOLOR and that the pupa hangs free by the tail end, without a girdle-thread.

11. JALINDRA Horsf. (Pl. XXVI, 153*a*, *b*).

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 109, *No.* 41 (1828)	Amblypodia	Jalindra.
HÜBNER, *Zuträge*, *fig.* 671, 672 (1832).	Sithon	Thymbraeus.
MOORE, *Cat. Lep. E. I. C.*, I, *p.* 50, *No.* 85 (1857) .	Myrina	Jalindra.
HEWITSON, *Ill. Diurn. Lep.*, *p.* 28, 40 (1863) . . .	„	„
„ „ „ „ *Suppl.*, *p.* 24, *pl.* 3*a*, *fig.* 96—98 (1878)	„	„

DE NICÉVILLE, *Butt. of India*, III, *p.* 373 (1890) . . . . Tajuria Indra.
SWINHOE, *Lep. Ind.*, IX, *p.* 102, *pl.* 4, 4*c* (1911—12) . . „ „
FRUHSTORFER, *Berl. Ent. Zeit.*, LVI, *S.* 209 (1911) . . . „ Jalindra.
COURVOISIER, *Tijdschr. v. Ent.*, LV, *bld.* 19 (1912) . . . Charana „

W. J. Sindanglaya (1074); vicinity of the Tjiletou or Sandbay on the south coast (± 150); Gedeh mts. (coll. COURVOISIER).

C. J. Wonosobo (800) (JACOBSON).

E. J. Without further indication of place of capture (FRUHSTORFER).

The light patch on the upperside of the secondaries of the ♀ is sometimes faint bluish white, but sometimes also very distinctly pale blue.

12. JANGALA Horsf. (Pl. XXVI, 154*a*, *b*).

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 113, *No.* 44 (1828). Amblypodia Jangala.
„ *and* MOORE, *Id. E.*, *p.* 46, *pl.* 1*a*, *fig.* 11 (1857) Sithon „
DE NICÉVILLE, *Butt. of India*, III, *p.* 380 (1890). . . Tajuria „
SWINHOE, *Lep. Ind.*, IX, *p.* 123, *pl.* 727, *fig.* 5, 5*a*, 5*b*
(1911—12) . . . . . „ „

W. J. Without further indication of place of capture (FRUHSTORFER).

C. J.?

E. J. Malang; without further indication of place of capture (FRUHSTORFER).

My specimens, all ♀, belong to FRUHSTORFER's subspecies JANGALA JANGALA, which he takes for a form belonging to the rainy season, and distinguishes from the subspecies BELLA of the dry season.

Genus NEOCHERITA [1]) Dist.

1. HYPOLEUCA Hew. (Pl. XXVI, 155).

HEWITSON, *Ill. Diurn. Lep.*, *p.* 38, *No.* 40, *pl.* 17, *fig.* 54, 55
(1865) . . . . . Myrina Hypoleuca.
„ *Ill. Diurn. Lep. Suppl.*, *p.* 3, *pl.* 2, *fig.* 70, 71
(1869). . . . . „ Martina.

[1]) In the Leiden Museum there is also a specimen of N. AMRITA Felder, which according to an unreliable label would come from Java. I do not consider this label as sufficient authority for including this amongst the Javan species, the more so that FRUHSTORFER is also unacquainted with it in Java.

DE NICÉVILLE, *Journ. Bombay Soc. of Nat. Hist.*, IX, *p.* 312, 314 (1895)	Manto	Hypoleuca.
„ *Journ. Bombay Soc. of Nat. Hist.*, IX, *p.* 314, *pl. P, fig.* 44 (1895)	„	Martina.
DRUCE, *Proc. Zool. Soc. of London*, 1895, *p.* 505, 506	Pseudonigrina	„
SWINHOE, *Lep. Ind.*, IX, *p.* 130, *pl.* 729, *fig.* 1, 1*a*, 1*b* (1911—12)	Manto	Martina.
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *S.* 252 (1911)	Biduanda	Hypoleuca.

W. J. Gedeh mts. Mountains in the Province of Prayangan.
C. J.?
E. J. Without further indication of place of capture (FRUHSTORFER).

2. MANDARINUS Hew. (Pl. XXVI, 156).

HEWITSON, *Ill. Diurn. Lep.*, *p.* 28, *pl.* 11, *fig.* 67 (1863)	Myrina	Mandarinus.
DE NICÉVILLE, *Butt. of India*, III, *p.* 401, *pl.* 28, *fig.* 222 (1890)	Charana	„

W. J. Gedeh mts.
C. J.?
E. J.?

Genus HYPOLYCAENA Felder.

1. ISAEUS Hew. (Pl. XXVI*a*, *b*).

HEWITSON, *Ill. Diurn. Lep.*, *p.* 44, *pl.* 19, *fig.* 13, 14 ♀ (1865)	Jolaus	Isaeus.
„ „ „ „ *Suppl.*, *p.* 10, *pl.* 4, *fig.* 35, 36 ♂ (1878)	„	„

I caught a ♂ of this species in W. J. on mount Megamendoung (1250) and SIJTHOFF caught another in the Prayangan mts. at 1500 meters height. FRUHSTORFER, who regards TAJURIA CLEOBOIDES Elwes (included by SNELLEN in this species) as a separate species, these Javan form of which he calls EPIGESES, found it in both sexes in W. J. In consideration of what was said above in connection with JOLAUS RELATA Dist. I here quote Snellen's description of this species fully.

Segment 1 and 2 of the palpi in front are largely dingy white, at the top and at the back, black, like segment 3. Upperside of the primaries of the ♀ for $\frac{3}{5}$ dark sky blue, rather shiny, but the anterior margin above the middle cell black like the rest of the wing, more outwards the blue field is somewhat

hollewed out in the middle, where somewhat more than the upper quarter forms a round light purple patch, with greenish blue rather coarser scales in the middle. The secondaries are almost entirely blue, and the base white greenish with light grey inner margin; dark grey tail corner, marked with a little red yellow and greenish blue, towards the wing apex narrow black posterior margin and blackish brown fringes. In the ♂ the blue field of the primaries is larger, rounded off outwards and only $\frac{1}{3}$ black besides the anterior margin; secondaries marked like the ♀ and for the rest the blue paler.

Underside of the wings of both sexes brownish grey, the cross vein unmarked, at $\frac{2}{3}$ a narrow grey-brown cross line can be seen, which is edged on the outer side with rather greyish white. The line is continued on the primaries to vein 1 and on the secondaries to vein 3. Then come dark brown lines, which run into a large dark yellow patch, which occupies almost all the space from vein 4 to the tail corner and is marked at the end of cell 2 with an oblong patch, on the lobe with a smaller round black one and between with a grey shiny greenish-blue scaled one. Fringe line black, edged tailwards from vein 4 with white. Fringe dark grey.

The thorax is greyisch white, the abdomen yellowish white, like the legs, and these clearly ringed with dark grey on the tarsi and shins.

According to Snellen Isaeus Hew. is a Hypolycaena which, although it certainly differs somewhat from the rest of the Javanese species of this genus, he does not think it necessary to make into a separate genus. He thinks that in the Britomartis cleoboides (de Nicéville, *Journ. Bombay Soc. of Nat. Hist.*, IX, *p.* 306). Isaeus Hew. is confused with Cleoboides (Elwes, *Proc. Zool. Soc. of London;* 1892, *p.* 637, *pl.* 44, *fig.* 4, 5.) as the description and illustration of the latter species do not correspond to Isaeus.

I must remark in connection with this, that Snellens description of the ♀ is not made from a Javan specimen, but from one from Sumatra. I shall, not however, venture to express an opinion upon this question. I should only consider this justified, if I had at my disposal a large amount of material from different districts. A generic difference may not be based merely upon small differences in colour; in this respect not only do the individuals from different districts vary but not seldom even those from the same district, without its being necessary—at least from a scientific point of view—to constantly make separate subspecies of them, and to submit them to a zoological baptism.

2. Erylus Gdt. (Pl. XXVI, 158*a*, *b*).

Godart, *Enc. Meth.*, IX, *p.* 633, *No.* 60 (1819—23). Polyommatus Erylus.
Hewitson, *Ill. Diurn. Lep.*, *p.* 49, *pl.* 21, *fig.* 1, 2, 4 (1866) Hypolycaena „

Distant, *Rhop. Mal., p.* 225, *Tab.* 20, *fig.* 5, 6 (1882—86)	Hypolycaena	Erylus.
Staudinger, *Exot. Schm., S.* 282, *Taf.* 96 (1884—88)	„	„
de Nicéville, *Butt. of India*, III, *p.* 390 (1890). . .	„	„
Swinhoe, *Lep. Ind.*, IX, *p.* 93, *pl.* 723, *fig.* 1, 1*a*, 1*b* (1911—12) . . , ...	„	„
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *S.* 237 (1911)	„	„
Courvoisier, *Tijdschr. v. Ent.*, LV, *bld.* 19, *pl.* 1, 2 (1912)	„	„

The larva lives upon Vangueria Spinosa *Roxbi* in symbiosis with the ant Oecophylla Smaragdina F. A complete biological description of this species with excellent illustrations has been published by Edw. Jacobson in the *Tijdschrift voor Entomologie*, LV, (1912), extracts from which are given in the Introduction. The larva is of the usual Lycaenid shape, green with two longitudinal stripes, coloured alternately brown and white which unite at the posterior end, and with an indistinct dark green dorsal line. The pupa is also of the usual form attached to a twig by some fine tissue along the outer side; the observer did not discover any girdle-thread. It is green, sometimes mottled with brown.

3. Thecloides Felder (Pl. XXVI, 159).

Felder, *Wien. Ent. Monatschr.*, IV, *p.* 395, *No.* 3 (1860)	Myrina	Thecloides.
Hewitson, *Ill. Diurn. Lep., p.* 49, *No.* 4, *pl.* 22, *fig.* 9, 10 (1865)	Hypolycaena	„
Distant, *Rhop. Mal., p.* 237, *fig.* 78 (1882—86) .	„	„
Semper, *Schm. d. Phil.*, I, *p.* 213, (1890) . . .	„	„
de Nicéville, *Butt. of India*, III, *p.* 392 (1890) .	„	„
Swinhoe, *Lep. Ind.*, IX, *p.* 83, *pl.* 723, *fig.* 2, 2*a*, 2*b* (1911—12)	Chliaria	„

W. J. Batavia (3—14); vicinity of Pelabouan Ratou or the Wijnkoopsbay on the south coast (158).

C. J.?

E. J.?

As regards colour and markings the sexes present no difference.

4. Merguia Doh. (Pl. XXVII, 160).

Doherty, *Journ. Asiatic Soc. of Bengal*, LVIII, *p.* 427, *pl.* 23, *fig.* 2 (1889).	Chliaria	Merguia.
de Nicéville, *Butt. of India*, III, *p.* 397 (1890). . . .	„	„

Druce, *Proc. Zool. Soc., London*, 1895, *p.* 404, *pl.* 33, *fig.* 16, 17	Hypolycaena	Skapane.
Swinhoe, *Lep. Ind.*, IX, *p.* 82, *pl.* 721, *fig.* 4, 4*a* (1811—12)	Chliaria	Merguia.
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *p.* 231 (1911)	„	Skapane.

One specimen, without further indication of place of capture, obtained by Kühl and Van Hasselt in Java may be found in the Leiden museum. Fruhstorfer found this species later also in Soukaboumi (607) in W. J.

5. Amabilis Martin (Pl. XXVII, 161).

Martin, *Einige neue Tagschm. von Sumatra*, *p.* 11 (1895)	Zeltus	Amabilis.
de Nicéville, *Journ. Bombay Soc. of Nat. Hist.*, IX, *p.* 309, *pl. P, fig.* 42 ♂ (1895).	Chliaria	„
„ *Journ. Bombay Soc. of Nat. Hist.*, IX, *p.* 311, *pl. P, fig.* 43 ♀ (1895)	„	Tora.
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *p.* 231 (1911) .	„	Amabilis.

Snellen also takes de Nicéville's Tora to be the ♀ of Amabilis. I received a ♀ of this kind from the Prayangan mts. in W. J. and Fruhstorfer collected 12 ♂ near Soukaboumi (650).

6. Othona Hew. (Pl. XXVII, 162).

Hewitson, *Ill. Diurn. Lep.*, *p.* 50, *pl.* 22, *fig.* 17, 18 ♂ (1865)	Hypolycaena	Othona.
„ *Id. Suppl.*, *p.* 14, *pl.* 5, *fig.* 37, 38 ♀ (1869)	„	Elthola.
de Nicéville, *Butt. of India*, III, *p.* 395 (1890) . .	Chliaria	Othona.
Swinhoe, *Lep. Ind.*, IX, *p.* 78, *pl.* 721, *fig.* 1—1*c* (1911—12)	„	„
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *p.* 271 (1911)	„	„

The specimen given in the illustration was captured by the late Dr. van der Weele in Buitenzorg, and is contained in the Leiden museum. It is described as a special Javan form by Fruhstorfer in the place quoted.

Corcerning the larva, Swinhoe gives the following particulars from observations, made in British India. "Larva, of the usual onisciform shape, but with all the segments well defined, and with the anal segment extended into two distinct short protuberances; head concealed, whole surface clothed with minute bristles; colour green, with a rosy-red dorsal band of the same colour; feeds

on orchid flowers. Pupa fastened along the stem of the orchid, is smooth, of the common lycaenid type, greenish grey, slightly marked with white and with generally a distinct wavy mark on the wing covers."

Genus ZELTUS de Nic.

1. Etolus F. (Pl. XXVII, 163*a*, *b*).

Fabricius, *Mant. Ins.*, II, *p.* 66, *No.* 620 (1787) . .	Papilio	Etolus.
Horsfield, *Cat. Lep. E. I. C.*, *p.* 115, *No.* 46 (1828).	Amblypodia	,,
,, ,, ,, ,, ,, ,, *pl.* 1, *fig.* 9 (1828). .	Thecla	,,
,, & Moore, *Cat. Lep. E. I. C.*, I, *p.* 49, *pl.* 12, *fig.* 6, 6*a* (1857)	Myrina	,,
Distant, *Rhop. Mal.*, *p.* 256, *Tab.* 20, *fig.* 23 (1882—86)	Hypolycaena	,,
Staudinger, *Exot. Schm.*, *p.* 283, *pl.* 96 (1884—88) .	,,	,,
de Nicéville, *Butt. of India*, III, *p.* 400, *pl.* 28, *fig.* 221 (1890)	Zeltus	,,
Swinhoe, *Lep. Ind.*, IX, *p.* 86, *pl.* 722, *fig.* 1—1*c* (1911—12)	,,	,,
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *p.* 242 (1911).	,,	,,
Courvoisier, *Tijdschr. v. Ent.*, LV, *bldz.* 19 (1912). .	,,	,,

Fruhstorfer regards the Javan specimens as the subspecies Pompadius. In some of them the white on the upperside of the secondaries is almost entirely absent.

W. J. Buitenzorg (265); Soukaboumi (605) mount Gedeh, vicinity of Pelabouan Ratou or Wijnkoopsbay on the south coast (150); without further indication of place of capture (Fruhstorfer).

C. J. Touban on the north coast; Wonosbo (Jacobson); sea shore of Nousa Kambangan (Jacobson).

E. J. Province of Pasourouan; Province Banyouwangy; without further indication of place of capture (Fruhstorfer).

Illustrations of the larva and pupa are given by Moore and Horsfield. On these are based Swinhoe's and de Niceville's descriptions, and the latter's drawings of larva and pupa. As Moore's and Horsfield's illustrations are as a rule very bad, I do not wish to repeat the description here.

Genus HORAGA Moore.

1. Onychina Stdgr. (Pl. XXVII, 164*a*, *b*).

Staudinger, *Iris*, *p.* 113 (*Onyx*) (1889) . . . . . Sithon Onychina.
Druce, *Proc. Zool. Soc. London*, 1895, *p.* 611, *pl.* 34, *fig.* 8 Horaga Corniculum.

Fruhstorfer calls this species H. Moulineina Onychina Stdgr. (Deutsch Ent. Zeitschr. Iris A. 1911, p. 34) and he found them common in the Tengger mountains (650) in E. J. Staudingers specimens were also from E. J. and mine are partly from the Province of Pasourouan, partly without any further indication of the place where they were caught. Fruhstorfer gives another form H. M. Holothura Swinh. as probably occurring in W. J.

2. Anytus Stdgr. (Pl. XXVII, 165).

Staudinger, *Iris*, II, *p.* 113 (1889) . . . . . Horaga Anytus.
Fruhstorfer, *Berl. Ent. Zeitschr.*, XLIII, *S.* 180 (1898) . „ Anara.
„ „ „ „ LVI, „ 233 . . . . „ Anytus.

Fruhstorfer gives the form Anara from E. J.

Genus CATAPOECILMA Butl.

1. Major Druce (Pl. XXVII, 166).

Druce, *Proc. Zool. Soc. London*, 1895, *p.* 612 . . . Hypochrysops Major.
Distant, *Rhop. Mal.*, *p.* 235, *Tab.* 22, *fig.* 17 (1882—86) Catapoecilma „

Fruhstorfer caught this species in the Province of Prayangan in W. J. He calls the specimens from there Sophonias. I received the accompanying illustration from Fruhstorfer. It does not completely correspond to the one published by Distant.

The larva and pupa of the nearly related form C. Elegans Herb. Druce of which Swinhoe gives an illustration are described from British India thus—:

"Larva feeds on Terminalia Paniculata, is onisciform flattered, head and tail segments looking very similar; head completely concealed; it is roughish in texture, but not pubose; colour dirty green, with a patch of dark green in the centre of the back; it is also a good deal mottled everywhere. Pupa, fastened by the tail along a leaf, narrow, without projections of any kind; of a greenish brown, minutely dotted with darker brown."

Genus SEMANGA Distant.

1. Superba Druce (Pl. XXVII, 167).

Druce, *Proc. Zool. Soc., London*, 1873, *p.* 351, *No.* 1, *pl.* 32, *fig.* 11	Ilerda(?)	Superba.
Distant, *Rhop. Mal.*, *p.* 239, *Tab.* 21, *fig.* 13 (1882—86)	Semanga	,,
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *p.* 235 (1911). .	,,	,,

Fruhstorfer caught this species in W. J. on the south coast and in the department of Soukaboumi (600).

Genus DRUPADA Moore.

1. Ravindra Horsf. (Pl. XXVII, 168*a*, *b*, *c*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 117, *No.* 47 (1828) .	Myrina	Ravindra.
,, ,, ,, ,, ,, ,, *pl.* 1, *fig.* 11, 11*a* (1828)	Thecla	,,
Boisduval, *Spec. Gen.*, I, *pl.* 22, *fig.* 1 (1836) . . .	Myrina	,,
Druce, *Proc. Zool. Soc., London*, 1895, *p.* 617, *pl.* 34, *fig.* 7	Marmessus	Surindra.
Fruhstorfer, *Berl. Ent. Zeitschr.*, LXI, *p.* 250 (1911)	,,	Ravindra.

W. J. Depok (95); Tjampea (160); mnt. Gedeh (700); vicinity of Pelabouan Ratou or the Wijnkoopsbay (150).

C. J.?

E. J. Loumadjang (45); without further indication of place of capture; mountains along the south coast (600) (Fruhstorfer).

This species is very common in various places in Java. Some ♂ are found in which the extent of the blue on the upperside of the secondaries is greatly reduced. There is no difference between the few specimens from E. J. that I possess, and those from W. J. Fruhstorfer however gives the specimens that he collected in E. J. as a local form, which he calls Medullia. The larva feeds upon the young leaves of *kopo* (Eugenia Densiflora Duthia). The anterior part of its body is higher than the posterior part, the colour is very light green or rose colour, which in the full grown larva turns in red-brown; in the middle of the back there is a brown diamond shaped-figure. The segments are sharply separated from eachother on the back and covered there with microscopic tufts of hair. The brown pupa, fastened by a girdle-thread, is the shape of a shoe, with the sole placed against the wall and the toe pointing upwards. A pupa of May 13th produced an imago on May 24th.

2. Tharis Hbn. (Pl. XXVII, 169).

Hübner, *Zuträge*, *p.* 22, *fig.* 883, 884 (1837) . . .	Oxyliades	Tharis.
Doubleday, *Gen. Diurn. Lep.*, *pl.* 74, *fig.* 3 (1851) .	Myrina	Pharis.
Distant, *Rhop. Mal.*, *p.* 257, *Tab.* 20, *fig.* 19 (1882—86)	Hypolycaena	Tharis.
de Nicéville, *Butt. of India*, III, *p.* 433, *pl.* 29, *fig.* 231	Eooxyliades	,,
Swinhoe, *Lep. Ind.*, IX, *p.* 195, *pl.* 740, *fig.* 3, 3*a*, 3*b* (1911—12)	,,	,,
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *p.* 341 (1911)	,,	,,
Courvoisier, *Tijdschr. v. Ent.*, LV, *bld.* 19 (1912) . .	,,	,,

Fruhstorfer calls the Javan form Javanicus. In this species there are individual varieties in the extensiveness of the white upon the upperside of the secondaries and in the tint of the upperside of the primaries, but a sexual difference, as in the case of Cheritra Freja F., cannot be recognized either in this or in any respect.

W. J. Tjampea (160); vicinity of Pelabouan Ratou or the Wijnkoopsbay (150); Soukaboumi (650) (Fruhstorfer).

C. J. Nousa Kambangan on the south coast (Jacobson).

E. J. Without further indication of place of capture (Fruhstorfer).

Genus APHNAEUS Hbn.

1. Vulcanus F. (Pl. XXVII, 170).

Fabricius, *Syst. Ent.*, *p.* 519, *No.* 323 (1775) . . .	Papilio	Vulcanus.
Cramer, *III*, *p.* 28, *pl.* 208 *E. F.* (1782).	,,	Etolus.
Hewitson, *Ill. Diurn. Lep.*, *p.* 61, *pl.* 25, *fig.* 34 (1865)	Aphnaeus	,,
Butler, *Cat. Lep. descr. by Fabr.*, *p.* 182, *No.* 1 (1869)	,,	Vulcanus.
de Nicéville, *Butt. of India*, III, *p.* 349 (1890) . . .	,,	,,
Swinhoe, *Lep. Ind.*, IX, *p.* 158, *pl.* 733, *fig.* 1—1*c* (1911—12).	,,	,,
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *p.* 220 (1911).	,,	,,

Fruhstorfer calls the Javan form Javanus.

W. J. Soukaboumi (600) (Fruhstorfer).

C. J. Mount Oumarang (1300) (Jacobson); Touban on the North coast.

E. J.?

De Nicéville gives the following account of the larva and pupa:—

"Larva when full grown, appears to be rather large, considering the size of the butterfly and is $\frac{11}{16}$ of an inch in length; colour pale green, the body of nearly equal width throughout, the fourth segment rather the widest, the constrictions between the segments hardly visible, the head large, (much larger than in any lycaenid larva known to me), black and shining, hardly hidden beneath the second segment, being quite visible from in front; the second segment marked with a large shining blackish patch which is divided in the dorsal line by a whitish line, with two similar but broader lines on each side; the third segment in anteriorly similarly marked; there is a double fine dorsal and subdorsal dark green line and a lateral single line; the three posterior segments are marked above much as are the second and third; the twelfth segment bears two prominent blackish pillars, from the upper edge of which spring several strong bristles. When frightened, the larva protrudes a somewhat long pale green tubercle from each pillar, which bears at its apex a few fine hairs. The pillars and tubercles are larger in this species than in any other known to me except Curetis Thetys Dury. The mouthlike opening in the dorsal line on the posterior edge of the eleventh segment is very conspicuous under a magnifying glass. The whole body is finely shagreened and the lateral edge and anal segment bear a fringe of numerous somewhat stout colourless hairs. The larva in Calcutta feeds on Clerodendron Siphonanthus P. Br.

Pupa, always found in a spun-up leaf or leaves, is either green or dark brown, of the usual lycaenid shape, smooth and shining, the head rounded, the thorax anteriorly slightly humped and angled at the sides, the abdomen gradually tapering posteriorly. There is much of interest in the habits of the larvae of A. Vulcanus. They are most carefully tended by two somewhat small species of black ants, which Dr. A. Forel of Genoa, has identified for me as Pheidole Quadrispinosa Jerdon and Cremastogaster N. S. (Nicéville Forel M. S.). A full dozen of these ants may be seen all at once on the body of a full grown larva, and many others round about, so covering the larva that little else but ants is visible; the larvae do not seem to mind the ants at all. The larvae pass most of their time in rolled-up leaves (only issuing forth when hungry to eat the surrounding leaves, always returning to their shelters when the meal is over), several in each shelter, four being the greatest number I have seen in any one shelter. Larvae of very different ages are to be found in the same shelter. Some of these nests are formed of the separate leaves spun together with silk, but usually the outer edges of a single leaf are spun together. When about to pupate, the full-grown larva spins a cocoon between two leaves. It is very slight, and both ends are left open; it is made of white silk, the entire structure being exactly like the nest certain green spiders spin

between leaves, in which they lie in wait for their prey. The ants which attend these larvae make a nest in the stern of the plant on which the larvae feed, often in a single branch of the plant. There is only one hole to the nest, far too small for a full-grown APHNAEUS larva to enter, but the ants take the small larvae inside."

I wish here to remark that even if the above mentioned species of CLERODENDRON does not occur in Java, other species do.

2. SYAMA Horsf. (Pl. XXVII, 171*a*, *b*).

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 107, *No.* 39 (1828).	Amblypodia	Syama.
HEWITSON, *Ill. Diurn. Lep.*, *p.* 61, *pl.* 25, *fig.* 7 (1865)	Aphnaeus	,,
DISTANT, *Rhop. Mal.*, *p.* 243, *pl.* 23, *fig.* 8, 9 (1882—86)	Spindasis	,,
DE NICÉVILLE, *Butt. of India*, III, *p.* 355 1890 . . .	Aphnaeus	,,
SWINHOE, *Lep. Ind.*, IX, *p.* 167, *pl.* 734, *fig.* 3, 3*a*, 3*b* (1911—12)	,,	,,
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *p.* 217 (1911).	,,	,,
COURVOISIER, *Tijdschr. v. Ent.*, LV, *bld.* 19 (1912) . .	Spindasis	,,

According to FRUHSTORFER the species called SYAMA by STAUDINGER (*Exot. Schm.*) is not this species but the following one.

FRUHSTORFER distinguishes the specimens from W. J. as SYAMA from those from E. J. PONGULIMA.

W. J. Soukaboumi (650); the vicinity of Pelabouan Ratou or the Wijnkoopsbay (150) (FRUHSTORFER).

C. J. Serondol near Semarang (200) (JACOBSON).

E. J. Mnt. Semarou (700); Tengger mts. (700); Ibid. (600) (FRUHSTORFER).

3. LOHITA Horsf. (Pl. XXVII, 172).

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 106, *No.* 38 (1828)	Amblypodia	Lohita.
HEWITSON, *Ill. Diurn. Lep.*, *p.* 61, *pl.* 25, *fig.* 10, 11 (1865)	Aphnaeus	,,
MOORE, *Lep. of Ceylon*, I, *p.* 107, *pl.* 41, *fig.* 1, 1*a*—*c* (1881)	,,	Lazularia.
DE NICÉVILLE, *Butt. of India*, III, *p.* 357 (1890) . .	,,	Lohita.
SWINHOE, *Lep. Ind.*, IX, *p.* 179, *pl.* 738, *fig.* 1—1*c* (1911—12)	,,	,,
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *p.* 218 (1911)	,,	,,

W. J. Province of Krawang (MÜLLER); vicinity of Pelabouan Ratou or the Wijnkoopsbay on the south coast (150); without further indication of place of capture (FRUHSTORFER).

C. J.?

E. J. Mnt. Semarou (700); without further indication of place of capture (FRUHSTORFER).

The larva, according to MOORE, feeds on CONVOLVULACEAE in Ceylon. According to a more complete description made in British India and published by Swinhoe "it feeds on" DIOSCOREA and XYLIA and also on "*kindal*" and on the guava, is shaped like that of ARHOPALA, but more rounded, very soft and velvety, and with longish hairs on the sides; the head is large and square and the anal segment protected by a hard, flat, glossy plate, and there are two short processes on the 12th segment as in A. VULCANUS F. In colour the head and anal cover are glossy brown, the rest of the body being dark green with a broken white band on each side; or dark brown mottled with lighter shades. The pupa of the ARHOPALA type, but much narrowed, the back is ridged, but not sharply so, and the head blunt. In colour it is dark glossy brown. It is fastened by the extremity only, along a leaf."

4. RECTILINEATA Fruhst. (Pl. XXVII, 173).

FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *p.* 219 (1911) Aphnaeus Rectilineata.

FRUHSTORFER caught both sexes of this species near Lawang (600) in E. J.

Genus CHERITRA.

1. FREJA. F. (Pl. XXVII, 174).

FABRICIUS, *Ent. Syst.*, III, 1, *p.* 263, *No.* 19 (1793) . .	Hesperia	Freja.
BUTLER, *Proc. Zool. Soc. London*, 1867, *p.* 34, 36, *fig.* 1, 1*a* ♀	Myrina	,,
,, ,, ,, ,, ,, ,, ,, ,, ,, ,, 2, 2*a* .	,,	Joffra.
DISTANT, *Rhop. Mal.*, *p.* 251, *pl.* 20, *fig.* 10 ♀ (1882—86)	Cheritra	Freja.
STAUDINGER, *Exot. Schm.*, *p.* 277, *pl.* 95 ♂ (1884—86). .	Myrina	,,
DE NICÉVILLE, *Butt. of India*, III, *p.* 409 (1890).	Cheritra	,,
,, ,, ,, ,, ,, ,, 410, *pl.* 29, *fig.* 226 ♂ (1890)	,,	Joffra.
SWINHOE, *Lep. Ind.*, IX, *p.* 206, *pl.* 742, *fig.* 2, 2*a*, 2*b* (1911—12)	,,	Freja.
,, ,, ,, ,, ,, 208, ,, 743, ,, 1—1*c* ,,	,,	Joffra.
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *p.* 242 (1911) . .	,,	Freja.

The Java form is indicated by FRUHSTORFER as Joffra. The difference in colour in the two sexes seems to consist only in this that in the ♀ both above and below the black transverse spot on the upperside of the secondaries there is a white spot, which in the ♂ only appears below it.

W. J. Prayangan mts; vicinity of Pelabouan Ratou or the Wijnkoopsbay on the south coast (150); without further indication of place of capture (700) (FRUHSTORFER).

C. J.?

E. J. Malang (443); without further indication of place of capture.

The larva and pupa have been observed in British India and SWINHOE gives the description thus. "Larva feeds on *jamba* (XYLIA DOLABRIFORMIS) and is of the woodlouse form with a raised ridge along the back, furnished with six sharp obligue, pointed protuberances; the anal segment is flattened, and the sides slope down to it, forming nearly rectangular corners; colour either green or pink, the protuberances being generally tipped with brown, which occasionally extends and forms a saddle. Pupa fastened along the stalk by the tail only, smooth, except in the centre of the abdomen above, where there are rough sharpish protuberances; its colour is green, becoming browner as it nears the imago state, marked on the wing covers and on the back of the abdomen with pink.

Genus BINDAHARA Moore.

1. SUGRIVA Horsf. (Pl. XXVII, 175).

HORSFIELD, *Cat. Lep. E. I. C.*, *p.* 105, *No.* 36 (1828)	Amblypodia	Sugriva.
,, ,, ,, ,, ,, ,, *pl.* 1, *fig.* 10, 10*a* ♂ (1828)	Thecla	,,
,, *and* MOORE, I, *p.* 51, *pl.* 1*a*, *fig.* 12 (1857)	Myrina	,,
DE NICÉVILLE, *Butt. of India*, III, *p.* 475 (1890) . .	Bindahara	,,
FRUHSTORFER, *Berl. Ent. Zeitschr.*, LVI, *p.* 244 (1911)	,,	Phocides.

FRUHSTORFER divides this species into two subspecies, SUGRIVA from E. J. and PHOCIDINA from W. J. The former he found in the vicinity of Malang (600), the latter in that of Soukaboumi at about the same height.

Genus LOXURA Horsf.

1. Atymnus Cram. (Pl. XXVII, 176*a*, *b*, *c*).

Cramer, *IV, p.* 82, *pl.* 331 *D. L.* (1782)	Papilio	Atymnus.
Horsfield, *Cat. Lep. E. I. C., p.* 121, *No.* 49 (1828) . .	Loxura	,,
,, ,, ,, ,, ,, ,, *pl.* 2, *fig.* 6, 6*a*—*c* (1828).	Myrina	,,
Boisduval, *Spec. Gen.*, I, *pl.* 7, *fig.* 3 (1836).	Loxura	,,
Distant, *Rhop. Mal., p.* 281, *Tab.* 24, *fig.* 7 (1882—86).	,,	,,
Staudinger, *Exot. Schm., S.* 278, *Taf.* 95 (1884—88). .	,,	,,
de Nicéville, *Butt. of India*, III, *p.* 436, *pl.* 29, *fig.* 232 (1890)	,,	,,
Swinhoe, *Lep. Ind.*, IX, *p.* 213, *pl.* 744, *fig.* 1—1*c* (1911—12)	,,	,,
Fruhstorfer, *Berl. Ent. Zeitschr.*, LXI, *p.* 221 (1911). .	,,	,,
Courvoisier, *Tijdschr. v. Ent.*, LV, *bldz.* 19 (1912) . . .	,,	,,

Fruhstorfer assumes two sub-species of this species in Java, one from E. J. which he calls Matienus and the other from W. J. Deinostratus and further describes an albino form from W. J. under the name of Emana.

I cannot, however, from my specimens confirm the differences which he enumerates. My specimens from W. J. and E. J. seem to me only to differ slightly sexually, in this respect that in the ♂, the colour of the upperside is darker than in the ♀, and on the upperside of the secondaries there is more black, all of which moreover varies somewhat in individuals. But this occurs both in W. J. and in E. J.

W. J. Batavia (3—14); Depok (95); Tjampea (160); Soukaboumi (600); Soukapoura (70); vicinity of Pelabouan Ratou or the Wijnkoopsbay on the south coast (150).

C. J. Touban on the north coast; Tjandi near Semarang (60) (Jacobson).

E. J. Loumadjang (345); Tengger mts. (700); mountains along the south coast (Fruhstorfer); mnt. Willis.

The larva on the leaf of Smilax anceps Voldd. It is sometimes dark red mixed with green, sometimes green with a little brown; in this it corresponds in colour to the plant on which it lives, the full-grown leaves of which are green, while the younger leaves and the leaf stalks are partly reddish. The pupa lies on a leaf or a leaf stalk fastened by a girdle-thread, is somewhat bent and handsome light green with a broad light grey dorsal stripe, which at the head end joins with the light grey and light brown mottling which covers the wing covers. A pupa of Jan. 5th produced an imago on the 15th of the month.

Genus YASODA de Nic.

1. Pita Horsf. (Pl. XXVII 177*a*, *b*).

Horsfield, *Cat. Lep. E. I. C.*, *p.* 122, *No.* 50 (1828) . . . Loxura Pita.
de Nicéville, *Journ. Bombay Soc. of Nat. Hist.*, VIII, 1, *p.* 14, *pl.* 50, *fig.* 5 (1893) . . . . . Yasoda „
Fruhstorfer, *Berl. Ent. Zeitschr.*, LVI, *p.* 224 (1911) . . . „ „
Courvoisier, *Tijdschr. v. Ent.*, LV, *bld.* 19 (1912) . . . . „ „

Fruhstorfer divides the Javan form into two subspecies, Pita from W. J. and Singama from E. J. As I only possess specimens from E. J. I cannot judge of the correctness of this division.

W. J. Soukaboumi (650) (Fruhstorfer).

C. J. Mount Oungaran (800) (Jacobson).

E. J. Mnt. Semarou (750); Province of Banyouwangy; Tengger mts. and mountains along the south coast (300—700) (Fruhstorfer).

Genus LIPHYRA Westw.

1. Brassolis Westw. (Pl. XXVII, 178).

Westwood, *Proc. Ent. Soc. London*, III, *Ser.* II. *p.* 31 (1864) Liphyra Brassolis.
Felder, *Novara Lep.*, *p.* 219, *pl.* 27, *fig.* 10, 11 (1867) . Sterosis Robusta.
Distant, *Rhop. Mal.*, *p.* 204, *Tab.* 22, *fig.* 18 (1882—86) Liphyra Brassolis.
Staudinger, *Exot. Schm. p.* 269, *pl.* 94 (1884—88) . . „ „
de Nicéville, *Butt. of India*, III, *p.* 491, *pl.* 29, *fig.* 243 (1890) „ „
Bingham, *Fauna of Brit. Ind.*, *Butt.* II, *p.* 452 (1907) . „ „
Swinhoe, *Lep. Ind.*, VIII, *p.* 251, *pl.* 701, *fig.* 1, 1*a*, 1*b* (1910—11) . . . . . „ „

I received a ♂ of this species from the Prayangan mountains in W. J., caught in the department of Soukapoura (700), and another was sold to me along with other butterflies caught in the Province of Prayangan, as coming from there. It corresponds in colour and markings to another ♂ in the Leiden museum, also from Java, but with no further indication of the place of capture. As the first mentioned specimen has unfortunately been lost, the illustration is made from the bought one. The colour and markings seem to differ somewhat from the former, and also from a specimen which I caught in Celebes,

and most of all from the illustration, of these specimens living in the north of Australia, given in "*A Guide to the Study of Australian Butterflies*". The life and development of this species, as we have said in the Introduction, have been very minutely observed in Queensland (Australia) by Mr. F. P. Dodd. Bingham gives these observations and also some others made in British India, very completely. According to these the butterfly lays its eggs on a tree where there are a number of nests of the ant Occophylla Smaragdina F. also occuring in Java, and the larva presumably feeds on the grubs of the ant. Another observer is said to have found the larva on the *gempol* (Sarcocephalus Cordatus Mig.), and thought that it fed upon the leaves of this tree. The larva pupates without shedding the larvin skin, but under it, so that "the larvin skin becomes the outer pupal shell," a circumstance which I have observed in another larva in Java. The symbiosis with the above mentioned ant seems to be by no means of a friendly nature, which, if the larva feeds upon the ant grubs, is certainly not surprising; but larva, pupa and even the imago in its first development seem to be protected from attack from the ants by scales and sticky threads. The last mentioned observer thinks that the Liphyra Brassolis Westw. also belongs to the twilight butterflies.

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OF

JAVA ERYCINIDAE AND LYCAENIDAE.

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Fig. 1*a*. Dodona Aponata Semp. ♂, *b* ♀.
„ 2*a*. Dodona Fruhstorferi Röb. ♂, *b* ♀.
„ 3*a*. Zemeros Flegyas Cram. ♂, *b* ♀.
„ 4. Abisara Atlas de Nic. ♀.
„ 5*a*. Abisara Echerius Stoll. ♂, *b* ♀, *c* larva. (*Vide* Pl. XXVII fig. 179, 180).
„ 6*a*. Taxila Haquinus F. ♂, *b* ♀.
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„ 9*a*. Miletus Zinckeni Felder ♂, *b* ♀.
„ 10*a*. Miletus Boisduvalii Moore ♂, *b* ♀.
„ 11. Miiletus Biggsii Dist. ♂.
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„ 12*b*. Allotinus Suka n. s. ♀, ♂ Pl. XXVII fig. 181.
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„ 15*a*. Allotinus Apocha Kheil ♂, *b* ♀.
„ 16. Allotinus Taras Doh. ♀.

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EXPLANATION OF PLATE XX.

Fig. 17. Allotinus Strigatus Moulton ♂.
„ 18*a*. Allotinus Portunus de Nic. ♂, *b* ♀.
„ 19. Allotinus Nivalis Druce ♂.
„ 20*a*. Allotinus Subviolaceus Felder ♂, *b* ♀ (small specimen), *c* larva.
„ 21. Logania Marmorata Moore.
„ 22*a*. Logania Massalia Doh. ♂, *b* ♀.
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„ 29*a*. Lycaena Hylax F. ♂, *b* ♀.
„ 30. Lycaena Roxus Godt.
„ 31. Lycaena Elna Hew.
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„ 33*a*. Lycaena Rosimon F. ♂, *b* ♀, *c* larva.
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„ 38*a*. Lycaena Aratus Cram. ♂, *b* ♀.
„ 39*a*. Lycaena Saturata Sn. ♂, *b* ♀, *c* larva.

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EXPLANATION OF PLATE XXI.

In this plate, for the sake of clearness, one half of some of the specimens is drawn on a larger scale. Moreover the high metalic polish of the blue could not be reproduced.

Fig. 40*a*. LYCAENA AMPHISSA Felder ♂, *b* ♀.
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„ 42*a*. LYCAENA CUNILDA Sn. ♂, *b* ♀.
„ 43*a*. LYCAENA KONDULANA Felder ♂, *b* ♀, *c* larva, *d* pupa.
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„ 46. LYCAENA LUCINDE de Nic. ♂.
„ 47. LYCAENA ABDUL Röber ♀.
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„ 50*a*. LYCAENA PAVANA Horsf. ♂, *b*, *d* ♀, *c* larva.
„ 51*a*. LYCAENA ATRATUS Horsf. ♂, *b* ♀.
„ 52*a*. LYCAENA VIOLA Moore ♂, *b* ♀.
„ 53. LYCAENA BERENICE Herr.—Sch. ♂, *b* ♀.
„ 54. LYCAENA USTA Dist. ♂.
„ 55. LYCAENA GLAUCA Sn. ♂.
„ 56*a*. LYCAENA BOETICUS Cram. ♂ (*the blue has a silver sheen*) *b* ♀, *c* larva, *d* pupa (*the girdle-thread is not visible*).
„ 57*a*. LYCAENA DATARICA Sn. ♂, *b* ♀.
„ 58. LYCAENA ARDATES Moore ♂.
„ 59. LYCAENA DONINA Sn. ♂.
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„ 61*a*. LYCAENA ANCYRA Felder ♂, *b* ♀.
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EXPLANATION OF PLATE XXII.

Fig. 63*a*. Lycaena Strabo F. ♂, *b* ♀, *c* larva.
„ 64*a*. Lycaena Strabo F., form Lethargyrica Moore ♂, *b* larva.
„ 65*a*. Lycaena Cnejus F. ♂ (*the underside is somewhat too dark*), *b* ♀, *c* larva, *d* pupa.
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„ 67*a*. Lycaena Parrhasius F. ♂, *b* ♀.
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„ 69. Lycaena Putli Koll. ♂.
„ 70. Lycaena Deliana Sn. ♂ (*the orange on the upperside sheems too conspicuously*).
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„ 75*a*. Lycaena Cossaea de Nic. ♂, *b* ♀.
„ 76*a*. Lycaena Cyanicornis Sn. ♂, *b* ♀.
„ 77*a*. Lycaena Coalita de Nic ♂, *b* ♂ *bis*, *c* ♀.
„ 78*a*. Lycaena Catreus de Nic. ♂, *b* ♀.
„ 79*a*. Lycaena Ceyx de Nic. ♂ (*the light spot on the upperside varies greatly in different specimens*), *b* ♀.
„ 80*a*. Lycaena Limbatus Moore ♂, *b* form Huegeli Koll., *c* id. ♀ (*in the blue on the upperside of a and c there are white spots*).
„ 81. Lycaena Haraldus F. ♂.
„ 82. Lycaena Placida de Nic. ♂.
„ 83. Lycaena Musina Sn. ♂.
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„ 88. Lycaenesthes Tessellata Moore ♀.
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EXPLANATION OF PLATE XXIII.

The high metalic polish seen in some specimens is not reproduced in the illustration.

Fig. 90*a*. AMBLYPODIA NARADA Horsf. ♂, *b* ♂ *bis*, *c* ♀, *d* ♀ *bis*, *e* larva.
„ 91*a*. IRAOTA TIMOLEON Stoll. ♂, *b* ♀.
„ 92. IRAOTA INORES Hew. ♀.
„ 93*a*. SURENDRA VIVARNA Horsf. ♂, *b* ♀.
„ 94*a*. SURENDRA FLORIMEL Doh. ♂, *b* ♀ (*the colour of the* ♀ *is somewhat darker*).
„ 95*a*. MAHATHALA AMERIA Hew. ♂, *b* ♀.
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„ 101. ARHOPALA ANTHELUS Doubl. and Hew. ♂.
„ 102*a*. ARHOPALA AUZEA de Nic. ♂, *b* ♀.

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EXPLANATION OF PLATE XXIV.

The high metalic polish seen in some specimens is not reproduced in the illustration.

Fig. 103*a*. ARHOPALA EUMOLPHUS Cram. ♂, *b* form SANHERIB Fruhst., *c* ♀.
„ 104*a*. ARHOPALA HORSFIELDI Pag. ♂, *b* ♀.
„ 105*a*. ARHOPALA AZATA de Nic. ♂, *b* ♀.
„ 106*a*. ARHOPALA BAZALOIDES Hew. ♂, *b* ♀.
„ 107. ARHOPALA AZINIS de Nic. ♀.
„ 108. ARHOPALA AEDIAS Hew. ♀.
„ 109. ARHOPALA DIARDI Hew. ♀.
„ 110. ARHOPALA FULGIDA Hew. ♀.
„ 111*a*. ARHOPALA APIDANUS Cram. ♂, *b* ♀, *c* larva.
„ 112*a*. ARHOPALA MUTA Hew. ♂, *b* ♀.
„ 113*a*. ARHOPALA PERISSA Dist. ♂, *b* ♀.
„ 114. ARHOPALA WEELII n. s. ♀.
„ 115*a*. ARHOPALA ARVINA Hew. ♂, *b* ♀.
„ 116. ARHOPALA BUDDHA Beth.—Baker ♀ (*the underside is somewhat darker*).
„ 117*a*. ARHOPALA AMMON Hew. ♂, *b* ♀.
„ 118. CURETIS MALAYICA Felder ♂.
„ 119. CURETIS SPERTHIS Felder ♂.
„ 120*a*. CURETIS INSULARIS Horsf. ♂, *b* ♀.

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EXPLANATION OF PLATE XXV.

Fig. 121*a*. Zephyrus Absolon Hew. ♂, *b* ♀.
„ 122*a*. Ilerda Epicles Doubl. ♂, *b* ♀.
„ 123*a*. Deudorix Lapithis Moore ♂ (*on the upperside of the forewings there is only a bluish shimmer*), *b* ♀.
„ 124*a*. Deudorix Malika Horsf. ♂, *b c* ♀.
„ 125. Deudorix Nasaka Horsf. ♂.
„ 126*a*. Deudorix Kessuma Horsf. ♂, *b* ♀.
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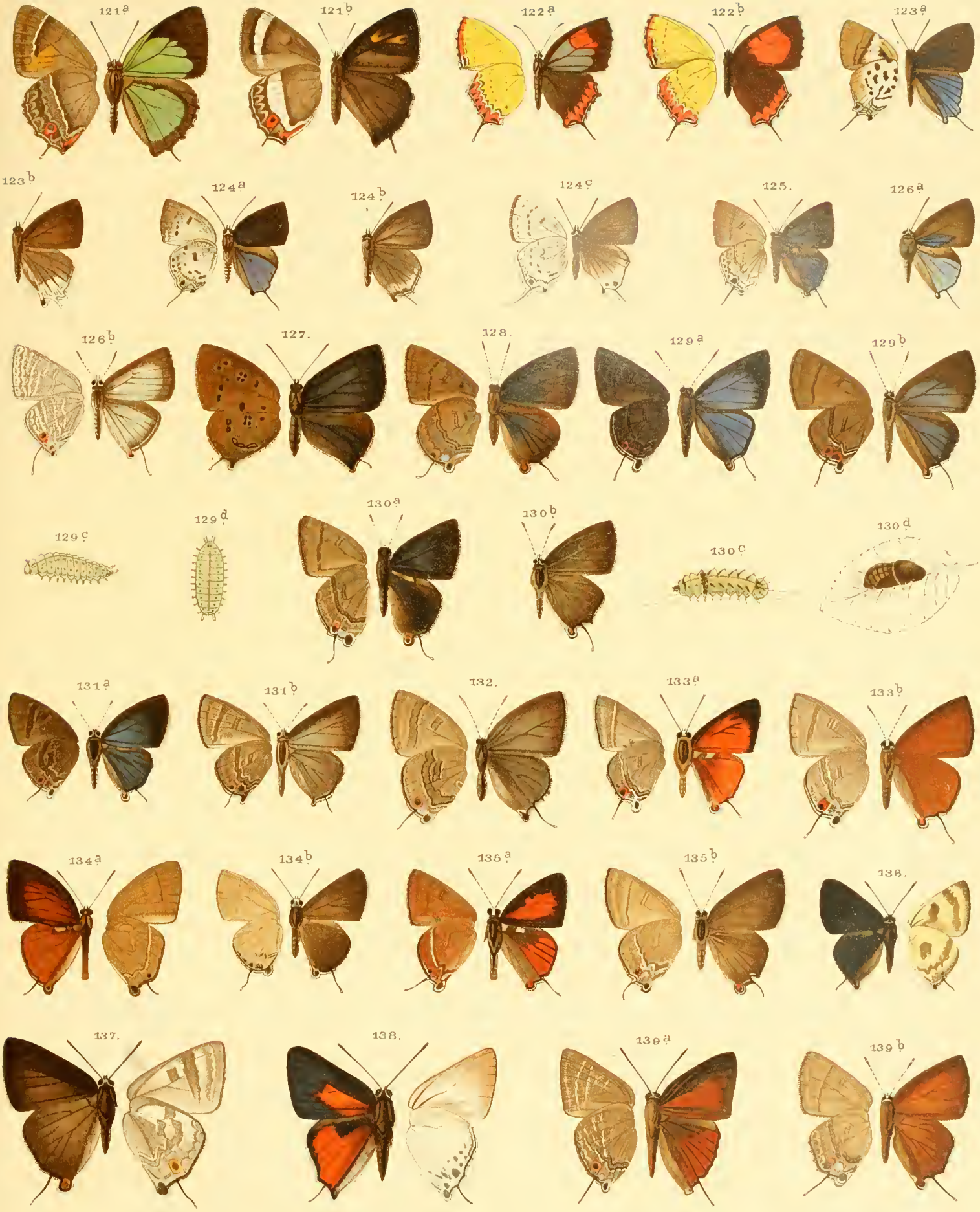
„ 128. Deudorix Utimutis Dist. ♀.
„ 129*a*. Deudorix Sphinx F. ♂, *b* ♀, *c d* larva.
„ 130*a*. Deudorix Orseis Hew. ♂, *b* ♀ (*the colour is a little too dark*), *c* larva, *d* pupa.
„ 131*a*. Deudorix Varuna Horsf. ♂, *b* ♀.
„ 132. Deudorix Sagata Fruhst. ♂.
„ 133*a*. Deudorix Jarbas F. ♂, *b* ♀.
„ 134*a*. Deudorix Barthemia Dist. ♂, *b* ♀ (*the shade of the underside is not the same in different specimens*).
„ 135*a*. Deudorix Xenophon F. ♂, *b* ♀.
„ 136. Deudorix Abnormis Elwes ♂.
„ 137. Deudorix Diara Swinhoe ♀.
„ 138. Deudorix Hypargyria Elwes ♂.
„ 139*a*. Deudorix Epijarbas Moore ♂, *b* ♀.



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EXPLANATION OF PLATE XXVI.

Fig. 140*a*. Deudorix Rhoda de Nic. ♀.
„ 141. Deudorix Ignota n. s.
„ 142*a*. Sithon Nedymond Cram. ♂, *b* ♀, *c* larva.
„ 143*a*. Jolaus Vidura Horsf. ♂, *b* ♀.
„ 144. Jolaus Cotys Hew. ♂.
„ 145. Jolaus Mantra Felder ♂.
„ 146*a*. Jolaus Cleobis Gdt. ♂, *b* ♀, *c* larva, *d* pupa.
„ 147*a*. Jolaus Dominus Druce ♂, *b* ♀.
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„ 149. Jolaus Cippus F. ♂.
„ 150. Jolaus Dewa Moore ♂.
„ 151. Jolaus Relata Dist. ♂.
„ 152*a*. Jolaus Diaeus Hew. ♂, *b* ♀.
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„ 154*a*. Jolaus Jangala Horsf. ♂, *b* ♀.
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„ 158*a*. Hypolycaena Erylus Gdt. ♂, *b* ♀.
„ 159. Hypolycaena Thecloides Felder ♂.

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EXPLANATION OF PLATE XXVII.

Fig. 160. HYPOLYCAENA MERGUIA Doh. ♂.
„ 161. HYPOLYCAENA AMABILIS Martin ♀.
„ 162. HYPOLYCAENA OTHONA Hew. ♂.
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„ 164*a*. HORAGA ONYCHINA Stdgr. ♂, *b* ♀.
„ 165. HORAGA ANYTUS Stdgr. ♂.
„ 166. CATAPOECILMA MAJOR Druce ♂.
„ 167. SEMANGA SUPERBA Druce ♂.
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„ 169. DRUPADA THARIS Hbn. ♀.
„ 170. APHNAEUS VULCANUS F. ♀ (*the* ♂ *is similar but smaller*).
„ 171*a*. APHNAEUS SYAMA Horsf. ♂, *b* ♀.
„ 172. APHNAEUS LOHITA Horsf. ♀.
„ 173. APHNAEUS RECTILINEATA Fruhst. ♂.
„ 174. CHERITA FREJA F. ♀ (*the two short tails are drawn too long; the* ♂ *has no white above the black on the secondaries, but is otherwise the same as the* ♀).
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